in a library of reference except when required by Committees of the Institute, or by members or holders of second class stock, who have obtained the sanction of the Committee. The second class shall include those books intended for circulation.

ARTICLE VI.—The Secretary shall have authority to loan to Members and to holders of second class stock, any work belonging to the SECOND CLASS, subject to the following regulations:

Section 1.—No individual shall be permitted to have more than *two books* out at one time, without a written permission, signed by at least two members of the Library Committe; nor shall a book be kept out more than TWO WEEKS; but if no one has applied for it, the former borrower may renew the loan. Should any person have applied for it, the latter shall have the preference.

Section 2.—A FINE OF TEN CENTS PER WEEK shall be exacted for the detention of a book beyond the limited time; and if a book be not returned within three months it shall be deemed lost, and the borrower shall, in addition to his fines, forfeit its value.

Section 3.—Should any book be returned injured, the borrower shall pay for the injury, or replace the book, as the Library Committee may direct; and if one or more books, belonging to a set or sets, be lost, the borrower shall replace them or make full restitution.

ARTICLE VII.—Any person removing from the Hall, without permission from the proper authorities, any book, newspaper or other property in charge of the Library Committee, shall be reported to the Committee, who may inflict any fine not exceeding twenty-five dollars.

ARTICLE VIII.—No member or holder of second class stock, whose annual contribution for the current year shall be unpaid or who is in arrears for fines, shall be entitled to the privileges of the Library or Reading Room.

ARTICLE IX.—If any member or holder of second class stock, shall refuse or neglect to comply with the foregoing rules, it shall be the duty of the Secretary to report him to the Committee on the Library.

ARTICLE X.—Any Member or holder of second class stock, detected in mutilating the newspapers, pamphlets or books belonging to the Institute shall be deprived of his right of membership, and the name of the offender shall be made public.

Vol. XVIII. No. 107. 12th July, 1890. Monthly, Price 10d.

EACH NUMBER CONTAINS VARIOUS ORIGINAL DESIGNS

THE JOURNAL OF FABRICS AND TEXTILE INDUSTRIES.

FOR SPINNERS, MANUFACTURERS, BLEACHERS, DYERS, PRINTERS AND FINISHERS,

EDITED BY
H. & R. T. LORD,
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LITTLE HORTON LANE,
BRADFORD,
YORKSHIRE.

OF COTTON, SILK, WORSTED, WOOLLEN, JUTE, AND ALL CLASSES OF TEXTILE FIBRES.

THIN FOREIGN EDITION.

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Contents.

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Fancy Woollens.

The continual changes and vagaries of fashion in woollen dress fabrics, suitings, shirtings, and cricketing flannels, and the seeking after novelties both in colour and design, make the designers lot far from an easy one. By a judicious use of good colours, however, much can be done to satisfy the taste of the most fastidious, and by a careful selection of different modes of interweaving, combined with good colouring, very pretty and novel effects can be obtained. Of course, the material used will have an effect upon the appearance of the fabric, as, for instance, an all wool fancy cloth will present a much smarter appearance than one made from cotton, as the cotton at all times will show the distinction of the lines of colour and the manner of interweaving, while the woollen will blend the colours together in one harmonious whole. Worsted and silk threads may be used with advantage in both materials, as a means of producing fancy stripes and checks. Fig. 1 will give an idea of what is meant by the use of designs of a fancy character, as distinguished from the ordinary simple twill. This pattern is formed of two other simple twills, the picks of which are taken alternately one from each, that is a simple five end twill is arranged upon alternate picks, say the odd numbers, and another twill upon 5 ends is put upon the even picks. This arrangement will cause the twill to run at a very high angle and to form a broad rib, though woven on a small number of ends. The ends of the pattern formed are the same as the simple twills used, but the picks are doubled, or the pattern is complete upon 5 ends and 10 picks. This pattern gives very good results in dyed goods, natural colours, or in striped patterns; made up as cricketing flannels in light coloured stripes on a white ground, it gives most novel effects. As a solid woollen, a good cloth would be 60 ends per inch, 30 yards warp, and 48 picks per inch, 40 yards weft, weight about 10 oz. for 30 inches. If it is desired to have the cloth heavier or lighter, this can easily be arranged by altering the thickness of the warp and weft and the relative quantities of ends and picks. Another novel effect can be got from this simple pattern by having the body of the fabric a thick warp—say about 25 yards, and the stripe a small worsted or silk—say about 2/40's worsted, or a 2/28's silk, and the stripe material slayed up in the reed 3 ends in a dent, and the ground warp 2 ends in a dent. This will cause the stripe to run at a much higher angle than the ground, giving an appearance of a waved line or twill across the fabric. Natural colours and sombre greys combined in this way upon a white ground give most novel and pleasing effects, and, by introducing good colour combinations into the stripe, variety is very easily attained. Fig. 2 is a reversible stripe based upon Fig. 1, 10 ends in each direction. The same remarks with regard to structure of cloth and combination of colours will apply as in the case of Fig. 1. If this is made from solid coloured warp, either white with a mixture weft, or all white, or all mixture, the effect will be very pleasing, or, if different counts of yarn are employed as mentioned in Fig. 1, it will give the effect of a different pattern in each stripe, as the finer yarn being laid finer in the reed will give the appearance of a twill at a different angle. Fig. 3 is a combination of two 6 end twills, pick and pick, being complete upon 6 ends and 12 picks, this again will be a twill at a very high angle, with a smaller twill running in the opposite direction. The build of cloth suitable to this pattern will be similar to that for Fig. 1, only more material can be put in, thus giving a heavier cloth. Fig. 4 is a combination of the same two twills used in Fig. 3, but a different effect is produced, owing to the two twills being in a different position in relation to each other. Fig. 5 is an arrangement of a simple four end twill upon alternate ends, and the same twill upon the intermediate ends, but in a different position. The effect in the cloth will be a small spot or crape figure running diagonally across the piece. The advantage of an arrangement of this kind will be to get a figured pattern upon a small number of healds. In this case, only 4 are required, the same number as the simple twill which forms the base of the arrangement. A good cloth for this pattern would be 46 ends per inch, 28 yards warp, and 44 picks per inch, 32 yards weft, making a 6 oz. cloth, finished 30 inches wide. Fig. 6 is based upon a 3 end twill and a 4 end twill, combined end and end, similar to Fig. 5. In this case, the pattern will not be complete on less than 24 ends and 12 picks, but it can be woven on 7 healds by resorting to drafting, the 3 end twill being drawn on the first 3 healds, and the 4 end twill on the back 4, alternate ends upon each set. The pegging plan is shown in Fig. 10. This will give an appearance of a large and varied pattern, though produced upon a comparatively small number of healds, and being well within the range of an ordinary tappet loom. Each set of healds would be woven with its own set of tappets, thus reducing it to what would be used in every day work. This class of pattern can be varied very considerably by using different combinations of a simple character; the twill might be combined with plain, or different twills might be used in combination, the main object to be looked for is that the pattern will complete itself and it is governed by the least common multiple of the two patterns employed, for instance, the example given is a 3 end twill combined with a 4 end twill, and these can only be complete at the same time by making them upon a number that each will divide without remainder, namely, 12, as this is the least number that each can be complete at the same time, so that 12 picks would be the least number that the pattern would be complete upon, but the picks are common to the two patterns, while the warp has separate ends to each pattern, so that it would have to be carried forward to double the least common multiple, or 24, to allow each pattern to have 12 ends upon which to complete itself. If a 4 end twill was combined in this manner with a 5 end twill, we should again have to find the least common multiple—which is 20—and carry the pattern over 20 picks and 40 ends. If it was a 3 end with a 5, the pattern would require 15 ends and 30 picks. If twill and plain are

Fig. 1.

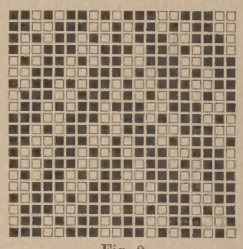

Fig. 2.

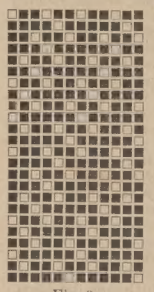

Fig. 3.

Fig. 5.

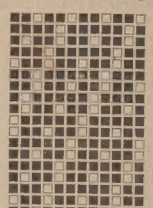

Fig. 4.

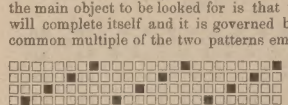

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Fig. 6. Design.

combined, the same rule would apply, or, in other words, whatever the combination, the pattern can only be complete upon the smallest number that each will divide into without remainder for the picks, and double that number for the ends, and, in making the drafts for them, taking the separate patterns upon separate sets of healds, as shown in the example given. Very pretty effects can be produced in this way, either in solid colours or by introducing colour, or, if each pattern is composed of separate colours, it would give a very novel effect, as there would be two separate and distinct colourings blending together, and the effect would be heightened by the two patterns falling in every position possible in relation to each other, as they must do in arrangements of this kind.

No. 7 is another example of the many ways in which a simple twill can be varied. Here we have 4 ends of an ordinary twill running across the piece in the usual way, then a clean cut is made, and another 4 ends run in the same direction, and so on, until the pattern is complete, which requires as many sets as there are ends in the pattern. This can be done with a variety of twills, care being taken that, before the pattern is complete, each heald has the same number of threads upon it, thus avoiding the difficulty of special stripe healds. By this method of arrangement, we get a waved line running across the piece instead of the ordinary straight diagonal. This kind of twill is very suitable for stripes, as the coloured threads will make the division in the pattern more prominent if each division consist of separate colours; or, if the ends of each division are one colour and the centres another, the break will not appear so striking, but the irregular line will be quite as apparent. No. 8 is another example of curved or irregular twills. In this case, a number of threads is woven in the ordinary way of simple twill, and then a number is woven in broken or satin order, so as to form a different angle of twill. This, of course, gives the appearance of a curved or bent line of twill, and it has the advantage that it can be woven upon the same set of healds by resorting to drafting, and it will not require any variation of the pegging plan. If the curve is too prominent, the angle of the stripe can be reduced to lessen the effect. By this means of working, a great variety of patterns can be produced, as this system is applicable to all twills, whether simple or made up of combinations, or, instead of letting a straight twill enter into the stripe, two irregular or broken twills might be employed, and they would give the curved form more neatly, as each would curve, and the junction of the two would be less striking. No. 9 is a corded check composed of squares of warp and weft cord respectively, running diagonally across the piece. By arranging this class of pattern in squares, the draft is very much reduced, as shown in the example given. If they were arranged in an ordinary diagonal, each thread would be different and require a separate heald to weave it, but by a judicious arrangement of the design, very good effects can be produced in a very simple manner. If patterns of this kind are woven in colours, either end and end and pick and pick, or two ends and picks of each alternately, it will have the appearance of a plain cloth on the face, while the separate working will cause the colours to appear arranged in check form. This style of figuring is so easy to apply and so prolific in variety that to give further examples would be unnecessary. The above are only a very few of the many ways in which variety of working and ornamentation can be produced. By a careful study of the builds of the simple arrangements given, a great number of very pleasing designs will suggest themselves, which, coupled with builds of cloths to suit, and a careful selection of colourings, will give infinite variety to fabrics of everyday use. If the cloths are required heavier than the ones mentioned, then it will be necessary to select patterns upon a greater number of ends, or which have less intersection in them, so as to allow of more or thicker material to be used.


Fig. 10.


Draft.


Fig. 7. Design.


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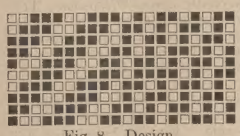
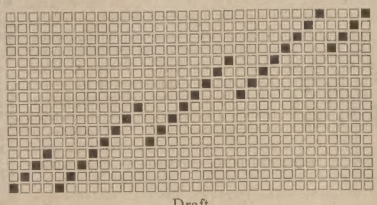


Fig. 8. Design.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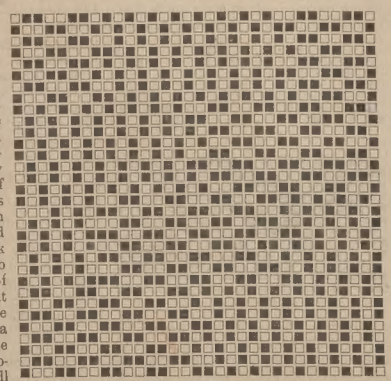


Fig. 9. Design.

The Microscopic Study of Fibres.

THE STRENGTH OF COTTON.

Considerable research has been made in recent years into the influence which the natural twist of the cotton fibres has upon the strength of the thread spun from it. Some writers find, apparently, a decided inclination in the fibres to twist in one direction only, while others are unable to detect any great difference between the number of fibres in a given sample which twist to the right and those which twist to the left. All agree in the fact that some kinds or samples of cotton will yield a much stronger thread than others, raised in the same neighbourhood, where the soil, culture, climate, weather, and care in gathering, are so nearly alike that we can detect no difference. But we are not aware that, in their researches, any have taken the precaution to examine carefully the strength of separate or single fibres, and to see if we may not explain from this standpoint any difference in the strength of the final thread, without reference to the twist. In an early paper upon this fibre, we remarked that cotton is strongest when the effects of soil, sunlight, and weather, have been so harmonized as to allow the utmost ripening or filling up of the hollow centre of the single hairs. When left so long before gathering that the storms break it, or when gathered before it is fully ripe, we shall have weakness in the fibre as a result. A long series of tests, in which the writer has been engaged, extending now over several years, have shown results of such interest that we place them on record in these papers. The direction of inquiry has been to find:—1st. How the strength of the fibres growing in the centre of the boll, and thus receiving the full warmth and light of the sun while ripening, compares with that of those growing at the outer or under side of the boll, where they are more or less shaded. 2nd. How the strength of the fibres at the centre of the boll compares year by year in the same locality, modifications of culture, seasons, &c., being noted. 3rd. Whether the ratio between the strength of the fibres at the centre of the boll and of those at the outside is the same for upland, lowland, and Sea Island, cotton. 4th. A comparison of the strength of the staple from the centre of the boll, from all regions of the world where cotton is cultivated for the market. We have employed in these researches the delicate single fibre strength tester.

COMPARISON OF STRENGTH AT CENTRE AND EDGE OF BOLL.

Attaching to the instrument a series of ten single fibres from the top of a boll of upland Alabama, their breaking strength, in the direction of the fibre's length, is found to be as follows:—1st, 31 grains; 2nd, 33; 3rd, 35; 4th, 40; 5th, 33; 6th, 30; 7th, 32; 8th, 31: 9th, 36, and 10th, 39 grains. This gives an average per fibre of 34 grains. The diameter of these fibres was very uniform, and was about $\frac{1}{1000}$ of an inch. They were well developed, having a very perfect structure. From the outside of the same boll, ten other single fibres were now selected and attached in their place. A glance at them, as they lay stretched in the microscopic field, showed them to be less perfectly developed, being flatter in body and rather larger in diameter than the others. The latter appearance was doubtless due to the greater flatness of the fibre, and not to a real excess in size. On now testing their strength, they were found to break as follows:—No. 1 at 20 grains; No. 2 at 25; No. 3 at 30; No. 4 at 17; No. 5 at 22; No. 6 at 26; No. 7 at 23; No. 8 at 20; No. 9 at 26, and No. 10 at 21 grains. Thus the average breaking strength was 23 grains. Nine other bolls of the same cotton were now taken, and ten fibres from the centre of each placed in test. The average result was as follows:—The ten samples from boll No. 2 (our first set being No. 1) gave a breaking strength, in direction of their length, averaging 31·5 grains; boll, No. 3, 32; No. 4, 33; No. 5, 33·5; No. 6, 29; No. 7, 30; No. 8, 31; No. 9, 26·8; and No. 10, 34·2 grains. The average of the 100 fibres taken from the centre of the ten bolls gave thus a breaking strength of 31·5 grains. The average diameter of the fibre was about $\frac{1}{1000}$ of an inch. From the same nine bolls, ten fibres each, selected from the outside, as in our second list, gave the following breaking weights:—Boll No. 2, 20 grains; No. 3, 21; No. 4, 21; No. 5, 21; No. 6, 17; No. 7, 18; No. 8, 20; No. 9, 20; No. 10, 24 grains. This gives an average strength for the 100 fibres from the outside of 20·5 grains. A comparison now between the central and the outer fibres shows a superiority of the former over the latter of nearly 50 per cent. of the strength of the latter, or an

inferiority of the latter (if we choose so to look at it) compared to the former of 33 per cent. Our first query is thus emphatically answered, showing at the same time the cause of the great difference in strength in fibres of the same commercial sample.

STRENGTH IN DIFFERENT KINDS OF COTTON.

Ten bolls of Alabama lowland, corresponding in grade to the ten bolls of upland Alabama just noted, were next taken. Ten fibres from the top of each boll were selected, as in the former case, and their strength found as follows:—The ten fibres of the first boll averaged in strength, 45 grains; the 2nd, 46; the 3rd, 50; the 4th, 48; the 5th, 52; the 6th, 40; the 7th, 43; the 8th, 50; the 9th, 51; the 10th, 47 grains—giving an average for each of the 100 fibres of 47·2 grains. Ten fibres from the outside of each of these bolls were next tested, resulting as follows:—Boll No. 1 gave an average strength of 39 grains; No. 2, 39; No. 3, 41; No. 4, 37; No. 5, 44; No. 6, 35; No. 7, 36; No. 8, 40; No. 9, 43; No. 10, 36 grains—an average breaking strength for the 100 fibres of 39 grains. This is a gain of 20 per cent. for the central fibres, as compared with the outer ones, or a loss of 16 per cent. for the latter, if we take the central ones as the standard. The average diameter of the central fibres was $\frac{1}{1\,8\,5\,0}$ of an inch; the outer were rather larger apparently, though this may have arisen from their being slightly flatter or less fully developed. Lastly, ten bolls of Sea Island cotton were taken—a very fine and long staple, and of first quality in every respect. Ten fibres from the centre of each boll were tested, resulting in the first boll giving an average breaking strength of 75 grains per fibre; 2nd, 70; 3rd, 65; 4th, 80; 5th, 76; 6th, 72; 7th, 69; 8th, 64; 9th, 79; 10th, 80 grains. We have, then, the remarkable average strength for the 100 fibres of 73·5 grains each—a result the more noticeable when we recall that the measured diameter of the fibres averaged less than $\frac{1}{8\,5\,0\,0}$ of an inch. Taking now our ten fibres from the outside of each of these ten bolls of Sea Island staple, we find them to average in strength as follows:—1st boll, 70 grains; 2nd, 70; 3rd, 65; 4th, 78; 5th, 74; 6th, 70; 7th, 65; 8th, 66; 9th, 76; 10th, 76 grains, or an average for the 100 fibres of 71 grains, or almost the same as the average of the central ones. In now summing up these results, which bear chiefly on our first and third queries (the second and fourth being reserved for a future time), several points are noticeable:— 1st. The strength of the outer fibres gradually approaches that of the inner ones as we advance from the lower to the higher grades of our staple, from the highland, through the lowland, to the Sea Island. In other words, the higher the quality of the staple, the more uniform is the strength, as well as the diameter, of the fibres composing it. 2nd. All the experiments given were upon the best grades in each kind. Other experiments made upon the lower grades in each render perfectly clear the cause of the differing strength in threads spun even from different parts of one sample. Each boll has an average strength of its own, greater in the centre, less at the under sides, and the weak bolls have weaker fibres in the centre than the strong ones. Thus the lack of uniformity is at once explained. 3rd. The fibre of Sea Island cotton, taken as a single fibre and before any of the processes of manufacturing have been employed upon it, is one of the strongest materials known. A tube of it $\frac{1}{8\,5\,0\,0}$ of an inch in diameter sustains, say, 75 grains. A tube of Cotswold wool $\frac{1}{1\,8\,5}$ of an inch in diameter and scarcely hollow at the centre sustains 350 grains. Taken area for area, neglecting the hollow portions of each, the cotton fibre is thus more than five times stronger than this—the strongest—wool, and if we take into account the cavity of each, we find the lifting power of the substance composing Sea Island cotton about eight times that composing Cotswold wool. This great strength, combined with evenness in diameter and length of staple, explains clearly the superiority of the Sea Island staple over all other cottons in the manufacture of fine, strong, threads.

THE GLOSS, OR GUM, IN COTTON.

Besides the general distinctions of Sea Island, gulf, and upland, so well known to the workers with the American staple, cotton is found to have other variations, which, though they are less striking to the eye, are of scarcely less practical importance. We know how the differences of staple, which cause these three well-known classes to be so distinct from each other are due to the influences of climate, and to the elevation and quality of the soil upon which the plant has grown. But workers have recognized for many years that the upland and gulf cottons of America, as a class, differ in other respects than in length and diameter of fibre from the cottons of India, and that both the American and Indian are, again, different from those of Egypt or other lands. In short, it seems that the fibre of each cotton-producing country differs from every other, and has some special working quality by which it is readily known to experts. In the detection of these subtle differences, the microscope is of great service. But we will first consider the appearances which are visible without its aid, and see what causes may be found to account for them. In seeking, then, in a general way, the influences which have resulted in these *nationalities*, as we may call them, we naturally turn at first to the charts of temperature and moisture of the various cotton regions, and next to their elevation above the sea, and to the character and quality of their soil. We find that in all the hot, moist, alluvial, islands of the world, where the land rises at most only a few feet above the level of the sea, and where the cotton plant is daily bathed by the winds in the salt sea air, the fibre is essentially uniform in length, diameter, and other qualities of staple, whether it grows upon our islands off South Carolina, or Georgia, on the East India Islands, or on the islands in the midst of the Pacific Ocean.

CHANGES DUE TO ELEVATION AND DRYNESS.

But if we ascend one of the rivers of Alabama, as we pass through the lowland belt to the farthest limit of the upland, we notice a gradually increasing change of staple, apart from the differences due to difference in seed. The fibre grows more shiny or lustrous as we pass into the drier regions, and, at the same time, grows flatter. The juices which, at the sea level, were utilized in filling the interior of the hollow fibre, and thus giving the round strong quality to Sea Island staple, are dried too quickly to be thus deposited. If they are dried very suddenly, they are deposited unevenly in lumps, but if the weather allows a steady, though rapid, ripening, they are deposited evenly throughout the fibre, and, instead of forming the central strength, are dried into a surface gloss. This excess of gum gives a new and most valuable property to the fibre, and, in proportion to its amount and the consequent flattening of the hollow cell, renders it capable of use in work for which other cottons are less useful.

INDIAN COTTONS.

But if the upland Alabama shows these traits clearly, they become far more conspicuous, and, in fact, reach their maximum, so far as is now known, in the cottons of India. The rapidity of increase in the amount of the Indian staple annually used in Europe is not due alone to the cheapness of its production. While it is much less strong, fibre for fibre, than our own upland, it has a gloss far superior to it, and thus, in all fabrics where strength is not the special aim, it gives a lustre not attainable, or only with the greatest difficulty, with the fibre from other lands. For this reason, it is now used in mixture with silk, either alone or with China grass, in those delicate, light, summer silks so deservedly popular, as well as in the heavier, loaded, silks of Continental make. Hence, too, its superiority in such goods as the soft, lustrous, sateens which, for a few years, have been imported to our market. For the lustre, being always accompanied by flatness, all threads spun from the fibre, when close twisted, combine the solidity of worsted with the full gloss of the single fibre, and when, as in the above uses, care is taken not to lose any of this gloss in manufacturing, the most beautiful results attainable with cotton are secured. This property of our fibre has risen into so great practical importance within a few years that it bids fair to make the Indian staple a strong rival of the American in many of the European markets, and, in the especial directions mentioned, entirely to supersede it. How far the upland staple of America can be made to rival the Indian in gloss it is not now possible to forsee. But it seems likely that, in the more elevated and drier regions of the cotton belt, it may be made closely to approach it. One element of the question is, doubtless, the small amount of the fibre raised per acre in India from the quality of the soil, and this our raisers will scarcely be able to rival.

MICROSCOPIC MARKINGS.

When we place a fibre or two of these high gloss cottons under the microscope, dry and view them as opaque objects by reflected light, they are found to reflect very strongly, showing a very brilliant line of light, contrasting in this very greatly with the Sea Island. And the brilliancy of this reflection is a measure of the gloss. But the easiest method of detecting their optical effect is by mounting them in balsam and examining them by polarized light. The sudden drying and ripening has put the substance of the fibre into a constant strain. The outside particles press hard upon those inside, and thus is caused that peculiar and beautiful phenomenon of double refraction, which makes each fibre glow in the dark field like a band of coloured fire, varying in tint as we pass along the fibre from end to end, and showing, by this variation, every inequality of ripening. Ripples, like water marks, lie all through it, passing into each other by the most delicate gradations of tint. Thus, most clearly, can we demonstrate the presence of this gloss gum. All cottons polarize, somewhat plainly, but it is reserved for those with high gloss to display the property in its utmost perfection.—*Textile Record.*

The Hydro-Extractor—High Speed and Useless Waste of Power—Accidents.

In the treatment of the whole branch of woollen finishing, from the boiling table to the box, we should leave our work incomplete, did we not take up in turn every separate process, however subordinate it may be. We come now to a subject which, in such a series as this, would seem almost unworthy of note or comment, but the mere fact that so little has thus far been written in reference to it is no reason why we should carelessly pass it by. We speak of hydro-extracting. This is, indeed, a simple and unpretentious operation, and does not, for a moment, take rank with such important and indispensable processes as those we have all along been considering. Still it is a fact that there are very few of the steps in the great work of the manufacturer that are so extremely simple and easy as to be completely understood and perfectly mastered by all who should have a thorough knowledge of them. We trust, therefore, to be able, even in such an almost trifling operation as this, to throw out some hint which shall be of use to our co-labourers in the finishing

department. The machine known as the hydro-extractor is of comparatively recent date, but the universal force, of which it is a beautiful application, is as old as time. Here is but another case in which the great powers of nature are called into play in serving man's convenience and man's necessities. As woollen finishing at the present day is practised all over the manufacturing world, we might say that the extractor has become almost indispensable. And yet strange enough, it is one of those machines which is seldom used with too much care. And it is to this point more particularly that we wish, in this paper, to draw special and direct attention. Every man who has had experience in mills where extractors are in use, and every man who reads the items of mill news contained in our textile publications, knows full well what a long list of dreadful accidents has already occurred from the use, or rather the abuse, of this machine. These accidents, in nearly every case, mean not only loss of life and limb, but also the destruction of property, and the delay and stoppage of the rest of the department. We hope, therefore, to be able to lay before the finishing world a few facts connected with this matter which shall serve a good purpose to those who are managing and running these, oftentimes, dangerous machines. The great majority of the accidents so constantly happening are due to one of the following causes. In the first place, many a calamity has been occasioned by running the extractor at a rate of speed which is inconsistent with safety. This is a point upon which most finishers are apt to be altogether ignorant. If there was any positive necessity for such an extraordinary rate of speed, we should not include this among the list of causes which might be done away with, or, at least, we should not place it first. It has been found, after estimating and calculating the speed of various extractors, now in daily and constant use, that many of them are run at a rate as high as 1,800 and 2,000 revolutions a minute. These figures, we wish it to be distinctly understood, are not by any means fanciful or imaginary. They are the results of actual tests, and represent facts gained from the most reliable sources. Such a rate of speed is much faster than there is any necessity for, and we cannot help believing that many of the horrid accidents which have already occurred have been due, in part if not altogether, to this one cause. Now the question naturally arises—is there any real necessity for such an extraordinary rate of speed, and, if not, how is the fact to be proved? This fact has been satisfactorily settled by one of the prominent manufacturers of extractors, and we may as well just give an idea of the methods and results of his experiments. The means of conducting the tests were simple and practical, and the results can be most confidently relied upon. A batch of wet cloth was taken and placed as usual in an extractor working at a low speed. After the goods had been running a certain length of time, they were taken out and weighed. After this, the cloth was again wet up in the washers and put back in the extractor. This time, the machine was run at a slightly higher rate of speed. After the same length of time, the goods were again removed and weighed as before. This operation was then carefully repeated, and the results noted in each case as high as 2,000 revolutions a minute. After all was completed and the figures compared, it was discovered that nothing at all was gained by running the extractor at a higher rate of speed than 1,500 revolutions a minute. This result shows two facts most conclusively. First, that all the water which can possibly be removed by centrifugal force is done away with by the machine when it is running at 1,500 revolutions a minute. And, secondly, it shows that to run the extractor at a higher rate of speed than the above does not serve to dry out the fabric, but only uselessly expends an amount of force that might have been utilized in some other way, whilst, at the same time, it very materially increases the possibility of accident. These then are facts which any man may prove for himself, and hence we think we are right when we say that it behoves every manufacturer who is at all interested in the safety of his help, as well as in the welfare of his property, to see to it that the extractors in his establishment are not being run at a higher rate of speed than is consistent with both safety and necessity. It may seem as though fifty or one hundred revolutions is but a trifle, yet it may be all that is required to result in incalculable damage to both life and property, and since such a speed is wholly unrequired, there is every reason why it should never exist. The second great cause of accident from the use of the extractor is carelessness on the part of the operative. This, of course, is in great measure beyond the power of the finisher to regulate. Still, he should know a careful hand when he happens to get hold of one, and only to such should the extractor be entrusted. Great trouble has often come from dropping hard, bulky, substances down between the perforated basket and the outer shell of the machine. This is a very frequent cause of damage and loss, and should be carefully guarded against. I remember a case which occurred not long since in which several hands were severely injured by the bursting of an extractor, and no one could discover what had really been the direct cause of the event. It was supposed at first that the accident was entirely due to bad material and defective workmanship on the part of the makers, and they were the ones who received the blame. But at last the real cause of the calamity came to light. It seems that a girl had let a monkey wrench drop down beside the basket into the open space beneath. She could not reach it with her arm, and so, for fear of receiving a scolding, on account of the delay which would ensue on taking the machine apart, she said nothing about it at all. The machine ran all right for a while, until the wrench changed position, and then the inevitable and awful result followed. So too much care cannot be exercised in just this one point of not allowing hard unwieldy substances to get down beside the basket, where they can do so much damage, if they only get into the right position for it. The hand of the operative should never, under any circumstances, be placed on the goods in the extractor after the machine is in motion. One of the most horrible accidents I ever knew occurred not ten feet from where I was standing, when the man who was in charge of the extractor tried to smooth down the cloth inside the machine after it had got well into motion. The hand became entangled in the folds of the goods, there were one or two swift and sudden jerks, and a corpse lay stretched upon the floor beside the machine, while a dead arm, with the grip which only death can give, went whizzing round with the cloth inside the basket. To be an eye-witness of one or two such ghastly scenes as these is all that is required to make a man pretty careful all the rest of his life. Then the last great cause of trouble is one for which the finisher is not at fault. We refer to bad workmanship and inferior materials used in the construction of the machine. No extractor should be for a moment trusted unless it has been made and tested by a reliable firm, and comes well recommended as regards workmanship and durability.

Regulations respecting Commercial Travellers in European Countries and in the Colonial and other Possessions of the United Kingdom.

(*Continued from page* 62).

CAPE COLONY.—Under the provisions of section 3 of Article 38 of 1887, an agent of a foreign* firm is defined as "any person other than an importer who sells, or offers for sale, by sample or otherwise, goods of a firm whose place of business is not in this colony, but shall not include a person who sells or offers for sale goods consigned to him by a foreign firm." In Schedule II. of the same Act under "Tariff of licenses, annual," it is provided that "For every agent of a foreign firm, the charge for license duty shall be £25, and by clause I. of this schedule, it is further provided that all the above (annual) licenses shall, no matter at what period of the year they may be taken out, expire on the 31st December then next. When any such license shall be issued upon or after the 1st July, there shall be payable only one-half of the appointed sum (which, in the case of an agent of a foreign firm, for a license taken out on and after the 1st July, would amount to £12 10s.). If taken out at any time before the 1st July, there shall be no deduction." A license as an agent of a foreign firm covers the business of the licensed person throughout the colony. That is, a license taken out at Cape Town will enable the licensed agent to travel to every town in the colony during the currency of the license. The license being personal cannot be transferred from one person to another. Therefore, an agent of a foreign firm who leaves the colony before the expiration of the license, and who is succeeded by another duly authorised agent of the same firm, cannot pass the license to his successor for the unexpired term of such license. No refund of license duty can be made in respect to a license which is only used for a period less than that mentioned in the license, the owner of which either returns to Europe or continues his journeys to other countries, or who is succeeded by another agent. Under the same section (3), an "importer" means every person who imports any goods other than the produce of South Africa for the purpose of trade or barter, provided that such importation shall be of the value of at least £1,200 during the year ending 31st December, "and the charge for license duty is £12," subject to the provisions above quoted as to yearly and half yearly licenses. Such and importer can act as an agent of a foreign firm, but, to enable him to sell the goods so imported, he would require a further license as a general dealer at £3. An agent of a foreign firm, who was not a *bona fide* importer, that is, one who imported goods not of the value of £1,200 in any one year, and who sought to evade the payment of the higher duty (£25) by taking out licenses as an importer (£12) and general dealer (£3), would render himself liable to a penalty of five times the amount of the license duty (or £125), under the provisions of section 6 of Act No. 13 of 1870, for trading as an agent of a foreign firm without a license. A "broker," under section 3 of the Act, is defined as every person (other than an importer or agent of a foreign firm) who shall, in this colony, carry on the trade or business of making bargains and contracts between other persons in matters of trade, commerce, or navigation, for a remuneration commonly called a "brokerage." The license duty is £5 for the whole year, commencing 1st January, or £2 10s. for the half-year commencing 1st July.

NATAL.—There are no written regulations on this subject, but there is an established practice here equivalent to a *lex non scripta*, that travellers' patterns or samples are allowed to be received under the deposit system, that is to say, the traveller makes a small money deposit with the collector, varying in amount according to circumstances and the discretion of the collector, and, when the traveller leaves the colony, he receives his deposit back, if he can show that he has not sold any of the goods. Patterns or samples of no intrinsic value, such as strips of cloth

* The word "foreign" is used to describe anyone not belonging to this colony, consequently, the expression "agent of a foreign firm," includes "agent of a British firm," or "agent of a British Possession firm."

or old boots and shoes, are regarded as free of import duty, but patterns or samples sold in the colony are charged with duty. If the commercial travellers trade or carry on business in Natal for foreign firms, they must take out the licenses, and pay the stamp duty imposed upon persons trading and carrying on business in Natal.

BRITISH GUIANA.—Under the Tax Ordinance in British Guiana, commercial travellers, bringing goods for sale into the colony, are required to take out a shop license, paying 48 dollars (£10) for the same, unless they, with the knowledge and consent of the Comptroller of Customs, transfer such goods, by instrument in writing, for sale to some person holding a store or shop license. Travellers bringing only samples and patterns to show are allowed to land the same free of duty, if the collective value of such goods would not, at the *ad valorem* duty, give more than 3 dollars duty. Larger importations of samples and patterns may be introduced, to be re-exported, on some local firm undertaking to satisfy the Customs Department that such goods shall not be brought into local consumption.

TRINIDAD.—Commercial travellers may be allowed to clear as baggage such samples as are necessary for transacting their business, duty being paid on any part of them liable to duty. On the written application of commercial travellers, which is to be filed in the baggage warehouse when the cashier's receipt on it for the deposit is obtained, the landing waiter examining their baggage may, without reference to the collector, deliver goods, liable to duty, brought as samples, on a deposit sufficient to cover the duty being made with the cashier, to be returned on the shipment of the goods, provided the amount of duty involved does not exceed £5. If it exceeds that amount, the collector's authority must be obtained. Owners of such goods are to be warned that the deposit will only be returned on production of the tide surveyor's certificate of having seen the goods aboard, such certificate to be endorsed on the receipt for the deposit, which is to be retained by the cashier when the deposit is returned.

JAMAICA.—Commercial travellers from abroad are not required to take out licenses in this colony.

HONG KONG.—There are no regulations affecting British commercial travellers, or the introduction of travellers' patterns and samples in force in Hong Kong.

LAGOS.—There is in this colony no legislation specially affecting British commercial travellers, or applying to the introduction of travellers' patterns or samples which, if found on entry to be of no intrinsic value, are allowed by the Customs authorities to pass free of duty.

ST. HELENA.—In St. Helena it is open to any person to sell, or offer for sale, goods of any description, without first obtaining a license so to do, and the Customs tariff allows any goods by any person to pass on payment of a small wharfage rate, viz.:—1s. for a case measuring 3 cubic feet. The case may contain goods of the value of £500.

LEEWARD ISLANDS.—No special regulations exist in any of the Presidences forming this colony, with regard to the introduction of travellers' patterns or samples.

NEW SOUTH WALES.—No license is required by a person who sells or offers for sale, by sample or otherwise, goods of a firm whose place of business is not in the colony, and all goods imported in excess of ordinary requirements for sample purposes, and having a saleable value, are treated as merchandise.

VICTORIA.—There are no restrictions whatever affecting commercial travellers in this colony.

WESTERN AUSTRALIA.—There are no regulations affecting British commercial travellers in this colony. Commercial travellers and others will be allowed to pass their samples on deposit of the duty due, the amount of duty to be decided by examination of the samples when entered inwards, a list of the goods being then taken. When entered outwards for drawback, the shipment is again to be examined and compared with the list, the full duty deposited on importation being refunded *pro rata* on any balance of the shipment, *provided it be exported within two months of the date of entry inwards.* The deposit, or the balance thereof after any refund, will be carried to the credit of the Government immediately after the goods, or the balance thereof, shall have been exported If no refund be claimed within two months from date of entry, the whole of the deposit will be carried to the credit of the Government. No refund of duty can be allowed on samples chargeable on importation with an *ad valorem* duty, when such samples are of a less total value than £50.

SOUTH AUSTRALIA.—Commercial travellers receive every consideration in South Australia They, of course, have to pay duty according to the tariff, but may obtain drawback on re exportation. They may also, on application, have their samples delivered on deposit of double the amount of duty, and, after exhibiting them may, on re-shipment, obtain a refund in full. Cut samples of dutiable articles are not charged duty. No license fees are required.

QUEENSLAND.—There are no special regulations affecting commercial travellers, either from the United Kingdom or elsewhere, in force in Queensland, nor are such persons required to be licensed. Respecting the admission of samples and patterns, the custom is to collect duty on goods alleged to be samples, when such are liable to duty; if they are reported intact, to allow a drawback of the duty paid on importation. If any portion of the goods is sold here, drawback is refused on the whole parcel. The minimum amount of drawback that can be paid is £2 Cut patterns of no commercial value are admitted duty free.

NEW ZEALAND.—In New Zealand, commercial travellers are not subject to any restriction of any kind, nor is there any license fee imposed on them. Travellers' samples are not charged with duty when they are of no commercial value—such as cut samples of drapery; but complete articles of clothing, boots and shoes, articles of plated ware, jewellery, hardware, &c., are not charged with full duty. In the case of travellers passing through the colony, full duty is collected at the port at which they first arrive, but, at the port of their departure from the colony, an account is taken of the samples in their possession, and duty on these is refunded on proof of due exportation.

BARBADOES —The only regulation affecting British commercial travellers is contained in a recently passed Act, and is as follows:—A drawback of the duty paid on any sample or specimen of goods brought to the island by a *bona fide* commercial traveller and, subsequently, taken away by him shall be allowed, provided it is shown, to the satisfaction of the proper officer, that such sample or specimen is re-shipped and about to be taken away, and is the same as the sample or specimen on which duty has been previously paid; and such drawback shall be paid by the Treasurer on the order of the Comptroller, such order being previously examined and signed by the Auditor-General.

Registration of Firms Bill.

This Bill, which if passed, will come into operation on January 1st, 1891, provides as follows:—(*a*) Any persons carrying on business under a name which does not consist of the full, or of the usual, names of all the partners, or of all the acting partners without addition; (*b*) Every person carrying on business, or having any place of business, in the United Kingdom, under any such name consisting of, or containing, any name, or addition, other than the full, or the usual, name of that person, shall register, in the manner directed by this Act, the name under which their business is to be carried on. Registration shall be effected by sending by post, or by delivering, to the registrar at the register office, in that part of the United Kingdom in which the place of business of the firm or person registering is, or is intended to be, situated, a statement in writing containing the following particulars:—(*a*) The firm-name; (*b*) The nature of the business; (*c*) The place or places of the business; (*d*) The full name, usual residence, and other occupation, if any, of the person or persons carrying on, or intending to carry on, the business; (*e*) If the business is commenced, or any new place of business is established after the commencement of this Act, the date of the commencement of the business or the establishment of the place of business. For such firms, or persons, as have carried on business before the commencement of this Act, it shall be sufficient if they register within one month after that date. Where a change occurs in the constitution of a registered firm, the members of the firm as re-constituted shall, within one month after such change, send to the registrar a statement thereof. A registered firm changing its firm-name shall be registered as if it were a new firm, and the statement sent or delivered to the registrar shall mention the former name of the firm as being abandoned by it, as well as the particulars required for a new registration. The penalty for non-compliance is one pound for each day of default. Where any firm or person, by this Act required to send or deliver any statement to the registrar, has therein made default, and during the default commences any action in the firm-name, or for a cause of action arising out of any dealing by such firm or person in the firm-name, the court shall order the firm or person in default to send or deliver to the registrar the proper statement, and may stay all proceedings in the action until the order be complied with, or allow proceedings to be continued on an undertaking to comply with the order within a time to be limited by the court. Every one commits a misdemeanour, and shall be liable to imprisonment with hard labour for a term not exceeding two years, who makes, signs, sends, or delivers, for the purpose of registration under this Act, any false statement purporting to be made under this Act and known by him to be false. The Bill provides that a register and an index of all the firms and persons registered, and of all the statements registered in reference thereto, shall be kept at register offices. The registrar of joint stock companies shall be the registrar of firms for the purposes of this Act. Any person may inspect, make extracts from, or copies of, the statements filed by the registrar in the register offices. This Bill is backed by Sir A. Rollit, Sir B. Samuelson, Mr. Lockwood, Mr. Forrest Fulton, and others.

Mr. Allan Cole's report on Irish lace manufacture contained in the annual report of the Science and Art Department is decidedly encouraging. Mr. Cole recently made a tour through the lace-making centres of Ireland, and delivered lectures at Thurles, Limerick, Tralee, Killarney, Kenmare, Kinsale, Youghal. Cork, Waterford, &c., and, after diligent examination into the subject of lace manufacture in those centres, reports that he thinks that everywhere there were signs of more activity in endeavouring to improve the material quality of the lace, both with regard to its artistic development and the organisation of its production. The sales, he estimates, must have increased some 38 per cent. since his previous visit in 1885. Kinsale he particularly mentions as having made great strides in designing and attempting new experiments.

Original Designs.

On our first plate is a design for a Table Cover, suitable for either Linen or Tapestry Goods.

* * * * *

On our second plate, we give a pattern for a Mantle Cloth.

* * * * *

On our third is one for a Brussels Carpet.

Monthly Trade Reports.

WOOL.—There is little new to note in this branch of trade. Wool has been sold only for actual requirements and, generally, in small lots just as consumers wanted them for use. Many spinners have resorted to the buying of tops, as these can be had mostly as required, and at rates that pay better than purchasing the raw material. At the London Sales, prices have shewn only a slight average fall, but, notwithstanding this, staplers find a great difficulty in procuring rates commensurate with those at the sales. In the yarn branches, there has been no increased demand, although inquiries have been more frequent. Many spinners have stopped a part of their machinery, and, unless things take a decided turn for the better, less will be run. Prices offered for new orders are such as spinners cannot possibly take without working at a loss. A quietness has also pervaded the piece branches, and especially has this been the case in worsted coatings, the prevailing opinion being that, what with the American tariff and the call for a new class of cloth for gentleman's wear, this branch will be quiet for some time to come. The dress goods departments have, perhaps, had more inquiries, but little new business has resulted.

COTTON.—The quantity of business transacted during last month was considerably below the average of the returns for April and May, and, had it not been for the number of orders booked during the two latter months, the tone of the markets would have been of a depressed character. The demand for most classes of yarns has been small, except in cases where a reduction in price has been taken, and, as a rule, manufacturers have only purchased for actual requirements, whilst merchants have been rather chary of placing new contracts. The tendency in some departments is to the accumulation of stocks, still these are by no means heavy. Spinners of Egyptian yarns have given way slightly in price in order to induce merchants to place orders, as this class is more plentiful than for some time past. For India, orders have been freely offered, but at rates unacceptable to producers, and the same may be said as regards China and Japan. Continental buyers have done very little, whilst home purchasers have bought moderately of the better kinds of yarns, but have neglected the lower descriptions. In cloth, the demand for the Eastern markets has been fair, and there has been little change in prices. Dhooties and jaconets have sold well for India. For China, some bulky orders have been on offer, but at rates that have prevented much business. The better classes of printings and shirtings have sold freely, but the lower kinds are accumulating, and orders have been few. Heavy cloths, although offered at lower rates, have been neglected.

WOOLLEN.—This industry has been quieter than for some time past, merchants generally having tried to place their orders at lower rates than have recently been prevalent. With some few exceptions, manufacturers have been very firm in their demands, and the consequence has been that not may new orders have been placed during the month, but producers are sanguine that their prices will be conceded, as merchants will be compelled to make contracts, owing to their customers wanting new goods. Manufacturers of the best description of worsted coatings have kept fairly busy, anything of good design and colouring meeting with favour. The cloths for the ready made clothing trade have sold fairly well, and seem likely to be in good demand for some time to come: this branch of industry grows continually: firms engaged in the trade enlarge their concerns and new firms commence. The plainer and heavier makes of fabrics have shewn a falling off in demand, and prices generally have become weaker.

LINEN.—Although a fair volume of business has been done in the linen industry, still, a rather quieter feeling has pervaded this trade. The call for drills has been less, and goods of a plain character have begun to accumulate. The demand for sheetings has kept good, and fairly profitable prices have been gained. Inquiries for domestic cloths, such as tea, toilet, towel, &c., fabrics have been many, and fair orders have been booked, fancy goods especially having sold well. Damask table linens have been in greater request, as manufacturers have recently been making lighter weight goods, which have met with favour. Hand made linens have not improved in demand in the slightest degree.

LACE.—Manufacturers are complaining of a falling off in business, and of the keen competition in all branches. Lace yarns of nearly all kinds have been in dull request, with the exception of those used in the curtain departments: these have sold fairly well. There has been a decline in orders for plain, heavy, and stiff, nets, and the same may be said of cotton millinery laces. Fancy and spotted nets have been in fair demand. The curtain trade has been moderately good, in fact, at present, this seems the only redeeming feature in the lace industry.

Classification of Articles in Customs Tariff.

RUSSIA.—A double tissue, having a surface of silk with the inside of wool, both connected by the thread of the warp, under section 198, similarly as half silk. Duty, 2 roubles 90 copecks gold per Russian pound. Scutching or harling machines (Coute's brake) used for bruising the ligneous parts of the flax stalks, under section 35. Duty 70 copecks gold per poud. Silk ribbons, as also tape with names of manufactories and firms embroidered or woven into them, serving for binding, or as labels for manufactured goods (linen pocket handkerchiefs, lace, silk, &c.), shall be admitted, as packing, free of duty, provided such labels or fastenings do not constitute of themselves some form of merchandise used in daily life.

ITALY.—Thread for sewing, of silk wound on cardboard, is taxed according to the actual net weight of the thread. Jackets of wool for men, partly lined with tissue of mixed silk.—Category 151*a* (1), or 151*b* (1). Duty, 4 or 5 lire the kilo, according to quality, with an addition of 50 per cent. for making up, as fixed by Category 160. Small cotton shawls, having the hems worked with woollen threads pressed dry and made to imitate a fringe.—Categories 105*b* (2), and 119*b*. Duty, 155 lire per quintal, with an addition of 40 per cent. for sewing. Small shawls of woollen net, with a fringe of wool and silk.—Category 156. Duty, 11 lire per kilogramme, with an addition of 50 per cent. for sewing. Shawls of black wool, embroidered with silk on one corner only, with a woollen fringe.—Category, 129*b* (1). Duty, 250 lire per quintal, with an addition of 25 per cent., in accordance with the Austro-Hungarian treaty. Curtains of *tulle anylais* or *torchon*, hemmed with large cotton threads spread about.—Category 120*a*. Duty 450 lire per quintal, with an addition of 10 per cent for sewing. Tissues of unbleached cotton, with black bands in proximity to the selvage.—Category 105*a* (2). Duty, 107 lire per quintal. Tissues of carded wool, with stamped threads.—Category 129*a* (1). Duty, 200 lire per quintal. Tissues of wool closely joined together with a strip of india-rubber.—Category 129*b* (1). Duty, 250 lire per quintal. Altar-cloths and toilet-table covers.—Categories 106*a* (1), and 109*b*. Duty, 419·40 lire per quintal.

VICTORIA.—

	£ s. d.
Apparel, articles of, being wholly or partly made up from materials containing wool, the duty on which is 30 per cent. *ad valorem* on importation	35 % *ad val.*
Apparel, slops, clothing, underclothing, and articles of attire, not otherwise enumerated, whether wholly or partly made up (except diving dresses, including boots, gloves, and helmets for such dresses)	25 % *ad val.*
Handkerchiefs (except of cotton or linen only) whether made up or in piece	10 % *ad val.*
Hosiery (except of cotton, linen, and elastic silk stockings for surgical purposes, or otherwise specified)	25 % *ad val.*
Note.—Hosiery means stockings, socks, and other machine or hand-knit covering for the feet or legs, and no other articles (sec 7, Act 769).	
Carpeting and druggeting	20 % *ad val.*
Do. being printed felt	Free.
Frilling, ruffling, plaitings, ruchings	25 % *ad val.*
Skirtings, wholly or partly prepared	100 ft. lin. 0 7 0
Rugs, waterproof, and horse-clothing	25 % *ad val.*
Quilts, sewn, cosies, and cushions	30 % *ad val.*
Silks (except hatters' silk plush, umbrella silk, silk for flour dressing, silk flags, oil silk, fringes, tassels, and gimp for furniture, reps, damasks, and other materials for covering furniture) in the piece, or piece goods, containing silk, whether cut into lengths, or shapes, or not	20 % *ad val.*
Woollen manufactures, or manufactures containing wool (exceipt printers' blankets and collar check), viz.:	
Blankets, blanketing, rugs and rugging	25 % *ad val.*
Piece goods, whether in the piece or cut into lengths or shapes, being vestings, trouserings, coatings, shirtings, broadcloths, witneys, naps, flannels, mantle cloths, cloakings, ulsterings, kerseys, serges, costume cloths, Melton cloths, and tweeds	30 % *ad val.*
Wool piece goods, being collar and check	Free.
Machinery for carding, spinning, weaving, and finishing the manufacture of fibrous material, and cards for such machinery; and machinery for sewing and knitting	Free.

One good way to prevent belts from slipping is to paint the face of the pulley. This can be done by using hot asphaltum, or white lead, made very thin with turpentine. It will adhere well if allowed to dry thoroughly. A thicker coat of white lead and oil should then be applied and allowed to dry thoroughly before being used. These coatings will not scale off if properly applied.

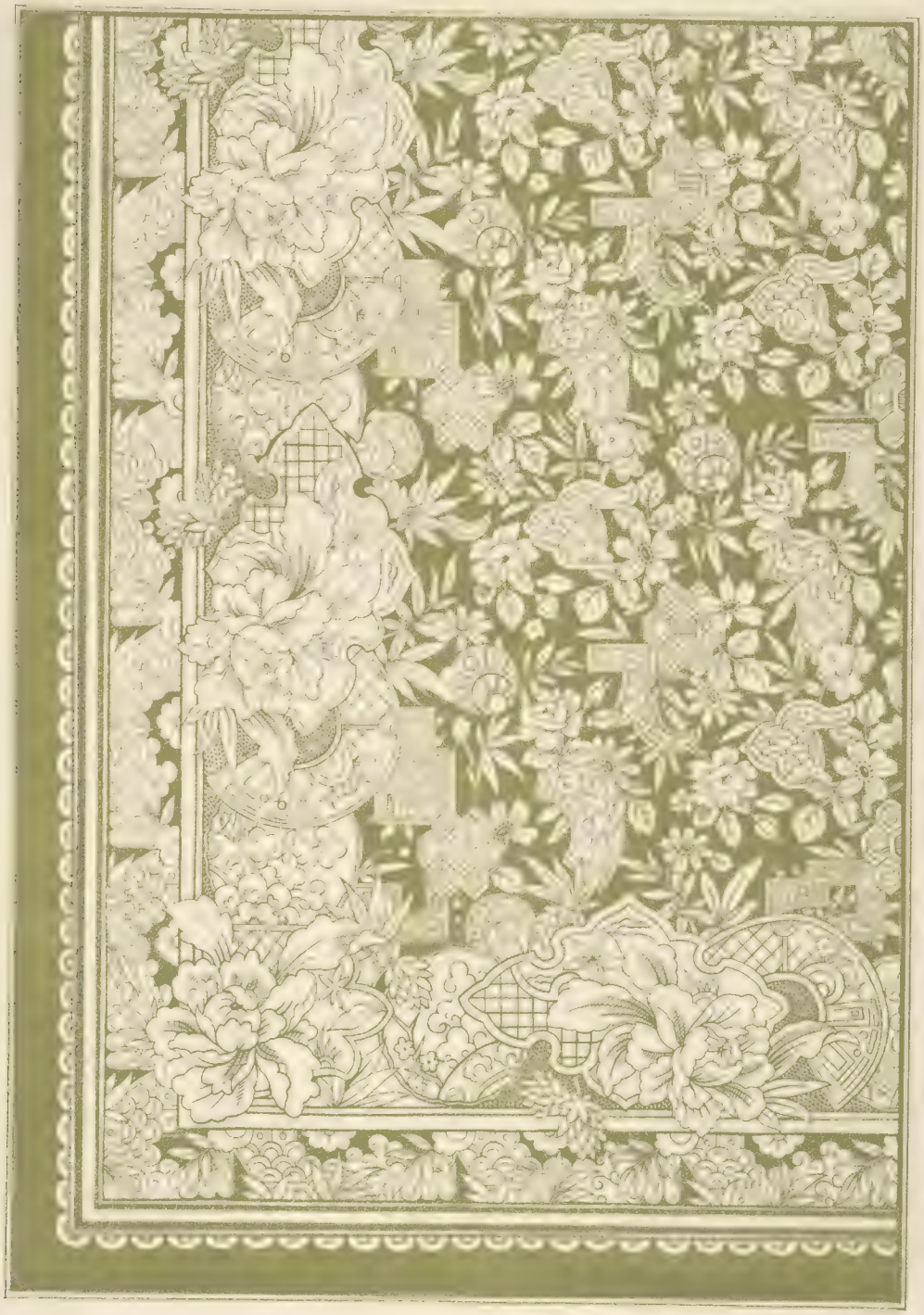


TABLE COVER.

MANTLE CLOTH.

BRUSSELS CARPET.

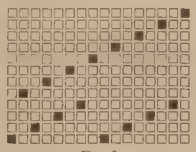
FASHIONABLE DESIGNS.

* * * * * A Supplement, containing Woven Specimens of the Designs given on this page, is presented each month to those of our Subscribers who manufacture Cloth for Ladies' and Gentlemen's wear.

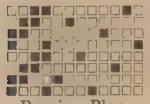
Worsted Trousering.

No. 643.

Design.



Draft.



Pegging Plan.

8,200 ends in warp; 128 ends per inch; 16's reed, 8 ends in a reed; 64 picks per inch; 64 inches wide in loom; 56 inches wide when finished.

Weight 16 ozs.

Warp :—18 ends	Dark Brown,	2/44's worsted	
10 ,,	White,	,,	
2 ,,	Dark Brown,	,,	
2 ,,	White,	,,	Twice.
2 ,,	Dark Brown,	,,	
2 ,,	White,	,,	
2 ,,	Dark Brown,	,,	
10 ,,	White,	,,	
8 ,,	Dark Brown,	,,	
4 ,,	Red,	,,	
6 ,,	Dark Brown,	,,	
10 ,,	White,	,,	
2 ,,	Dark Brown,	,,	
2 ,,	White,	,,	
2 ,,	Dark Brown,	,,	
2 ,,	White,	,,	
2 ,,	Dark Brown,	,,	
10 ,,	White,	,,	

144 ends in pattern.

Weft :—2 picks Light Brown, 2/44's worsted.
70 ,, Slate ,,

72 picks in pattern.

Woollen Suiting.

No. 644.

Design.

Pegging Plan

Draft.

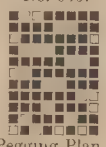
Warp :—		Weft :—
1 end Fancy twist, 9 skeins.		1 pick Twist, 11 skeins.
1 ,, White, ,,	3 times.	11 picks Blue, ,,
1 ,, Drab, ,,		12 picks in pattern.
1 ,, White, ,,		
1 ,, Blue Twist, ,,		
1 ,, White, ,,	3 times.	1,728 ends in warp; 27 ends per inch; 6¾'s reed, 4 ends in a reed; 28 picks per inch; 64 inches wide in loom; 56 inches wide when finished.
1 ,, Drab, ,,		
1 ,, White, ,,		

16 ends in pattern.

Weight 21 ozs.

Worsted Trousering.

No. 645.



Pegging Plan.

Warp :—2 ends	Brown Cord,	27 skeins.	
1 end	Black,	2/40's worsted.	
6 ends	Twist,	2/36's ,,	
1 end	Black,	2/40's ,,	
2 ends	Brown Cord,	27 skeins.	
1 end	Black,	2/40's worsted.	
18 ends	Blue,	,,	
12 ,,	Black,	,,	
18 ,,	Blue,	,,	
1 end	Black,	,,	
2 ends	Brown Cord,	27 skeins.	
1 end	Black,	2/40's worsted.	
6 ,,	Twist,	2/36's ,,	
1 end	Black,	2/40's ,,	
2 ends	Brown Cord,	27 skeins.	
13 ,,	Black,	2/40's worsted.	
12 ,,	Blue,	,,	
13 ,,	Black,	,,	

6,140 ends in warp; 96 ends per inch; 12's reed, 4 ends in a reed; 80 picks per inch; 64 inches wide in loom; 56 inches wide when finished.

Weight 20¼ ozs.

112 ends in pattern.

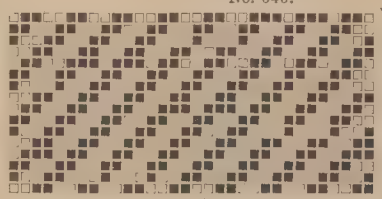
Weft :—All Brown, 27 skeins woollen.

Six times. Design. Four times.

Six times. Draft. Four times.

Woollen Suiting.

No. 646.



Design.

Pegging Plan.

Draft.

Warp :—	Weft :—
1 end Black, 13 skeins.	1 pick Brown, 11 skeins.
11 ends White, ,,	31 picks Blue, ,,
10 ,, Light Grey, ,,	32 picks in pattern.
10 ,, Dark ,, ,,	

32 ends in pattern.

1,920 ends in warp; 30 ends per inch; 7½'s reed, 4 ends in a reed; 32 picks per inch; 64 inches wide in loom; 56 inches wide when finished. Weight 20 ozs.

Ours was the first Journal in this country to give woven samples of various descriptions of fabrics regularly each month, and since we commenced this feature, some years ago, it has, to some extent, been adopted by others. In matters connected with every branch of designing, we stand ahead of all other Journals.

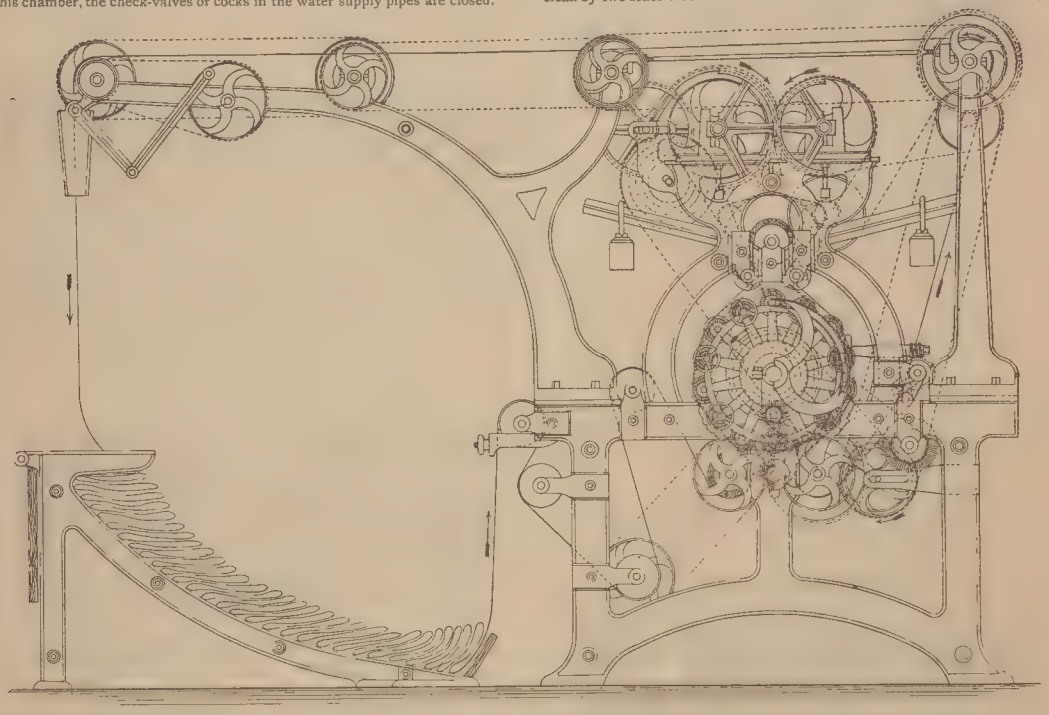
MACHINERY, &c.

The Carroll Boiler Water Purifier.

An apparatus, specially adapted for the purifying of water and the prevention of scale in boilers, is being shown at the Leeds Exhibition. It has some new features in its mechanism, and the operation is as follows:—Water, being admitted through the feed-pipe, will pass through the hole in the lower part of the head, flowing along the bottom of the apparatus, where it becomes heated by the action of the steam or water around its exterior, and, when it reaches the end, it will rise through the end space of the horizontal diaphragm into the upper chamber, whence it flows back to the front end, and passes out into the boiler, through the holes in the top of the mechanism, as shown. By this action, the water is heated, so that it is introduced into the boiler at a high temperature, and, in the heating, it is caused to deposit impurities which are contained in the water, these impurities being retained in the apparatus. When it is desired to clean out this chamber, the check-valves or cocks in the water supply pipes are closed, and the cock of the blow-off pipe is opened. Steam, thus entering the top chamber through the holes, and passing along above the diaphragm, goes downward into the lower part through the space and the slot at the end, thence returning, it passes out through the opening and pipe through the head, and thence through the blow-off pipe. This action completely carries off all sediment or deposit which has collected upon the surface of the diaphragm and in the lower part of the apparatus, leaving it perfectly clean. The advantages claimed for the apparatus are as follow:—Its construction is simple and easily applied to boilers; the feed water enters the boiler at the same temperature as the steam in the boiler, and, consequently, is pure; it precipitates, at 290 degrees, sulphate of lime, carbonate of soda, oxide of magnesia, oxide of iron, alumina and silica; being placed at water level in the boiler, it allows of a good surface blow-off, and relieves the boiler of scum and fatty matter, which are lighter than water, and prevents foaming. The impurities held in suspension by the apparatus can be blown off frequently, leaving the purifier, as well as the boiler, clean; it is guaranteed that water, entering the device at 60 degrees, enters the boiler at 320 degrees, under 80 pound boiler pressure. The apparatus is being made by the Carroll Boiler Water Purifier Co., Ld., 89, Cannon Street, London, from whom further particulars can be had.

Moser's Patent Double Action Raising Machine.

The most important exhibit at the International Exhibition at Leeds consists of a couple of machines for cloth raising, patented by Mr. Edward Moser, and shown by the sole agent for this country, Mr. A Miller, 41, Bloom Street, Manchester. Of the machines exhibited, one is an improvement on Moser's well-known cotton raising machine. The improvement consists of a peculiar arrangement of the card rollers, by which the cloth is continuously raised pile and against pile by one and the same raising cylinder, and without reversing the cloth itself. This double-action, or pile and against pile raising, produces a much fuller nap and a superior finish as to face, feel, bulk, and general appearance of the cloth, and fewer flocks are made. It entirely supersedes teazle gigs for raising the face or back of any kind of woollen or worsted cloth. Moreover, there is a great saving in time, labour, space, and power, as one machine is equal to ten ordinary gigs. The two machines, although constructed differently, more particularly as far as the action of the card rollers is concerned, accomplish very similar effects. Before entering upon a few particulars of the machines, we may say that any manufacturer desirous of testing their capabilities may do so by sending a piece of cloth to be raised at the exhibition. The illustration shows the Moser patent double-action cylinder raising machine, with differential motion. It will be noticed that this has fourteen card rollers, which are so arranged that seven of them have the *cards facing* in one direction and seven in the opposite way. By this arrangement, a continuous "*pile and against pile*" raising is obtained. The cards are kept clean by two brass wire clearer rollers. The cloth to be raised is stretched by means of an expansion roller before passing over the first contact with the cards, after which it runs over another expansion roller, and then meets its second contact with the cards. It then passes over a brass wire brush, the object of which is to strike down the nap, but this may be dispensed with when desired. The cloth then passes overhead to the plater and scray. Piece goods do not require turning end for end, but, by simply wireing the ends together, the cloth is run over the cards continuously until the face is completed, when the back may be raised in the same manner. An important point which may be noticed is that the machine is so geared that any desired energy of card rollers can be attained, according to the requirements of the heaviest or lightest goods to be raised. The second machine is the Moser-Martinot double-action special raising machine, on the oscillating lever system, which accomplishes work similar to hand raising. There are two levers, with four card rollers on each lever, two of which face towards the run of the cloth, and two in a reverse manner, and, on these coming in contact with the cloth in either direction, they are revolved, and thus a continuous "*pile and against pile*" raising is accomplished. Much of the description of the first machine is applicable to this also. There is the same roller for expanding the cloth before it passes over the first card lever, and, likewise, a similar roller before the cloth encounters the second

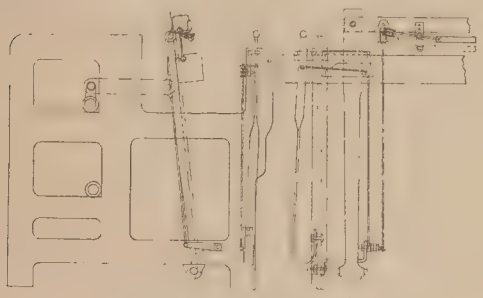


Moser's Patent Double Action Raising Machine.

card lever. There is also one brass wire clearer for each card roller, and the same endless overhead running of the piece, and also the brass wire brush for striking down the nap. The card rollers can be so regulated as to raise the lightest fabric, whilst the heaviest goods may also be treated with perfect results. We have had many opportunities of examining these machines at rest and in motion, we can, therefore, recommend our readers to take an opportunity of examining them, and should they feel disposed to avail themselves of the offer of Mr. Miller—to raise any piece of cloth sent him for that purpose—we have no doubt they will come to the conclusion that these are, perhaps, the best in existence for the purpose of raising any description of cloth.

Thompson's Patent Shuttle Guard.

There has been much correspondence during the past few years on the subject of shuttle guards, but, notwithstanding this, and the fact that accidents from flying shuttles are almost of daily occurrence, and that manufacturers in different parts of the textile districts are often called upon to pay damages in consequence, because they have failed to apply efficient guards to their looms, the use of such mechanisms is anything but common, although by the use of these appliances, many casualities could be prevented, and, therefore, manufacturers would seldom have to pay damages for their occurrence. It has frequently been suggested that the matter is one for parliamentary legislation, but although it has not come to that, it behoves manufacturers to use some appliances that will reduce the risk of accidents to a minimum. There have been many shuttle guards invented and applied to looms, some have acted very efficiently as far as reducing the liability of shuttle flying, still, in many there are defects on the score of first cost, and a continual waste of labour, and it is only fair to say that



Thompson's Patent Shuttle Guard.

many have been effective in every respect, although, as a rule, they have not been taken up in a proper spirit by manufacturers. A recently patented shuttle guard, and one that should meet the wishes of all, on the score of first cost and economy subsequently, has been brought out by Mr. Charles Thompson, Otley Road, Baildon, near Bradford. It consists of a flat bar of iron which works on two or more hinges, as may be required for the width of the loom. When the loom is in operation, the guard covers the shed, but allows the warp to be seen by the weaver equally as well as it is without the guard. Its motion is a kind of sliding one, as it works horizontally. When the loom stops, the guard folds itself up close to the hand rail, so that, when the weaver wishes to change a shuttle or to take up a thread, there is no inconvenience whatever, as it is in such a position that is is out of the way of the weaver's hands. Its mechanism is very simple, and its parts few, and it is constructed in such a manner that it does not easily get out of order. The whole of the apparatus weighs under 2 lbs., and this is carried by the hand rail. It can be seen working at the Technical College, Bradford, where it is giving great satisfaction. The mechanism can be understood from the annexed drawings, and further particulars and prices may be had of Mr. Thompson.

Smoke Annihilation.

A few days ago, a newly patented invention, which is guaranteed to annihilate smoke, was publicly tried before a number of engineers and others interested in the question. It is the invention of Mr. S. Elliott, of Newbury, Berkshire. The question on everybody's mind was one of curiosity to know how the smoke problem had come to be associated with such a purely agricultural centre as Newbury, but a brief conversation with the inventor, on the trim lawn of his charming little house, made the matter clear. Mr. Samuel Elliott carries on business in rather an extensive way as a manufacturer of mouldings for joinery. In short, he is a sawmill proprietor in a special line, and as he gives employment to about 150 hands, he must be of much more real importance in Newbury than a good many of the squires and country gentlemen round about. But he has to use steam, and so makes smoke, and this has brought him into conflict with the magistrates. Being of an inventive turn, he set to work, and the result is the apparatus—"Elliott's patent smoke annihilator." The principle is not new. Fifteen years ago, perhaps, an apparatus embodying the same idea was tried at the works of Messrs. Goodfellow, at Hyde, near Manchester. But Mr. Elliott is no plagiarist, and has worked out his own invention on his own lines. He simply draws the smoke, from the ordinary flue, by means of a fan, into a closed chamber about 4 ft. by 2 ft., in which there is a paddle-wheel or dasher revolving in water, and the smoke is washed. The machine is, indeed, very much like a large churn or clothes-washer, with some modifications. The water level is maintained at about a foot above the bottom of the cistern, and the inlet for the smoke is below the top-water level. Exhaust steam from the engine is also admitted in quantity sufficient to keep the water hot. The smoke, if the term is applicable, is discharged, cleansed from everything offensive, as a light fleecy vapour. A cambric handkerchief held over the discharge will neither be soiled nor take up any perceptible smell. The water in the vessel, of course, becomes very foul, and an analysis shows that, in addition to the solid carbon arrested, practically, the whole of the sulphur is absorbed, either as sulphurous or sulphuric acid. In fact, all the organic and inorganic impurities are washed out. That the process is effective was demonstrated beyond question the other day to all who were present at the trials. Beyond that, however, it is only possible to speak conjecturally. No quantitative tests were made, and there are no data upon which to base an estimate of the economic value of the invention. The power required to drive the fan, which takes the place of the tall chimney, as the creator of the draught necessary for combustion, is, apparently, not very great, and the only other power required is that for driving the paddles in the machine itself. The paddle-wheel is only about 2 ft. in diameter and, say, 4 ft. long. With the much larger machines, which would be required for a range of three or four Lancashire boilers, the power would probably become an item for consideration. Still, if there were an adequate return to be looked for, in the shape of bye-products, this would not matter. On this point, however, there is very little to be said. When the water reaches a point at which it ceases to act as an effective cleanser, it is drawn off from the vessel, and clean water introduced. The foul water is smoke-stained and contains a considerable quantity of solids, which are soon precipitated by settlement. But the main portion of the solids is arrested by perforated grids over the paddles, and finds its way out by another way in the form of a slightly greasy black sludge. Hitherto, the only direction in which it has been attempted to utilize the bye products is by drying this sludge, and converting it into a pigment for black paint. It certainly produces a dull black of admirable density, but it is obvious that, if Mr. Elliott's annihilator were to come into general use, the black paint market would be glutted. The economic question, therefore, remains to be answered. But this much can be said, that to small users of steam power, up to, say, 50 horse power, who, by reason of their situation or other circumstances, are troubled by the smoke difficulty, and to whom an expenditure of a few horse power for the driving and a slight addition in the way of wages are of comparatively little moment, this invention offers a practical and successful way out of their trouble. The mere use of the forced draught and consequent uselessness of the tall chimney will be enough, in many cases, to ensure the adoption of the contrivance.

New Patented Fabrics.

IMPARTING A SILK-LIKE LUSTRE TO FABRICS, THREADS, &c

It has been discovered that cellulose, when suitably treated, forms a good substitute for silk. The best cellulose for this purpose is that obtained from certain parts of young wood, prepared in a state of great purity, in order to avoid any complicating sub-reactions with the chemicals employed. With this material, a pure octo-nitro cellulose is made, by treatment with nitric acid (HNO_3), and then dissolved in a mixture of 38 parts of ether ($C_4\ H_{10}\ O$) and 42 parts of alcohol ($C_2\ H_6\ O$), in a proportion of 6·5 per cent. The cellulose thus treated is put into a tinned copper vessel in which an air pump keeps up a pressure of several atmospheres. In forming threads, a delivery tube is connected with the copper vessel lying on a inclined plane, on which are fixed glass tubes, each drawn out into a capillary part. A second tube surrounds each capillary tube, and is kept supplied with water. The material forced out from the capillary atmosphere is solidified at the surface on contact with the water, and flows therewith as a thin thread or filament, which is wound on to a bobbin. The nitric acid is then disengaged. Substitution products, consisting of starch or cellulose, in which hydrogen is more or less replaced by nitryl (NO_2), are termed pyroxylins. The thread produced as above described is a pyroxylin. Some pyroxylins lose their nitric acid in pure water, but more completely in dilute nitric acid of not greater density that 1·32, and the temperature of which should be caused to decrease slowly from 35° to 25° C. The cellulose thus treated becomes gelatinous and capable of absorbing, by endosmosis, various substances, particularly colouring matters and salts. It will then part with no more than 100 c.c. to 110 c.c. of NO_2 per gramme, and it has lost those explosive properties which, before denitration, it possessed, so that it is in a suitable state to be used in the manufacture of fabrics and for other threads. The object of the present invention is to extend the use of this article, and to apply it beneficially, and in novel and useful ways, to a great variety and number of other purposes. In carrying it out, threads, filaments, fabrics, lace, fringe, trimmings, ribbons, perforated and embossed fabrics, &c., are coated with octo-nitro cellulose, as above described. In coating threads, they are passed through the octo-nitro cellulose, and then through an aperture, by which all superfluous liquid is removed, then through water and on to bobbins. Any number of threads may be caused to pass through the vessel, and be thus coated and treated. Or, instead of passing the threads through the octo nitro cellulose, they may be brought into contact therewith, as it is forced from a capillary tube, and by giving a twist to such thread, or otherwise, be caused to adhere thereto. In either case, they are afterwards to be treated in a similar manner to threads or filaments made from the pure cellulose as described above. Or the completed octo-nitro cellulose thread or filament may be spun, braided, or otherwise attached round another thread, so that the latter shall form a core to the finished thread. In treating fabrics or other articles in the piece, or in continuous lengths, on which it is desired to produce a silk-like surface, the tubes, through which the cellulose is forced, either as threads or ribbons, are so

arranged that the fabric or other article will pass under or over them, and receive the cellulose on their surface wholly or in part. A tremulous or zig-zag motion may be given to the tubes, or to the article being coated. In some cases, more than one set of tubes may be employed, and may be so arranged that the cellulose filaments or ribbons, as they are forced out, may cross each other, and so form checks or other patterns. The separate layers may be applied at one operation, if so desired, or one layer may be first applied and treated as before described, and even dyed, then another and another, in like manner. By this process, one surface only of the material will be coated. The apparatus for carrying out this part of the invention consists of a long drum, having a slot along its surface, into which the selvages of the fabric to be treated are inserted and held by suitable clips or pins. The drum is then caused to revolve, and, as it does so, a filament or ribbon of octo-nitro cellulose is wound thereon. A zig-zag, or to-and-fro, or any other, motion is given, if desired, either to the drum or to the tubes, to one of which a steady onward movement is given for the purpose of ensuring an even coating of the filaments or ribbon on the fabric. The said filaments or ribbons may be received direct on to the fabric from the capillary tubes as they are formed, or they may be first wound on to bobbins and treated as before described, then affixed thereto. Different widths and colours of the said octo-nitro cellulose filaments or ribbons may be thus applied, either separately or at one operation. In some cases, a thin narrow coating of adhesive matter is applied to the fabric, as it revolves on the drum, just in front of the portion on which the filament is being wound. In some cases, too, a spiral direction is given to such filament, first from right to left, then from left to right, or, when so desired, in one way only. Pressure, with or without heat is also, in some cases, applied, in order to ensure the more perfect union of the filament or ribbon to the fabric. In some cases, especially in narrow goods, as ribbons and similar fabrics, they are wound spirally round the drum, and the octo-nitro filament or ribbon is then applied thereto. This will give a diagonal position to the filaments, which may, if desired, be reversed, thus producing a diamond pattern in one or more colours. When it is desired to coat the material on both sides, it is caused to pass between, and under, accurately fitted rollers into the liquid octo-nitro cellulose, and out through squeezers or rollers, also accurately fitted. It is then to be treated as before described. The material is, in some cases, first rendered waterproof by a coating of india-rubber, or in any desired manner. One of the objects for rendering the material or threads waterproof before applyng the octo-nitro cellulose is to prevent the same from penetrating the fibres of the fabric, and so rendering it harsh and destroying its flexibility. When, therefore, india-rubber is not used for this purpose, the best mode is to apply a thin surface of paper or paper pulp on one or both sides of the fabric, which, on being sized with glair, or other suitable matter, and either with or without a thin coating of varnish, will render the material or thread impervious, and thus permit of a thin coating of octo-nitro cellulose being applied on the surface or surfaces thereof without destroying its flexibility. Compound fabrics thus coated may be used for numerous purposes in lieu of goods made of silk, or of silk and other materials, as, for example, articles of dress, furniture, and other coverings, carriage linings, book covers, curtains, and table covers, lace, ribbons, braid and other trimmings, fringe, and numerous other articles and purposes to which silk, and mixtures of silk, and silk mixed with other materials, are now applied. When so desired, the material is dyed, printed, or otherwise ornamented, before, or after, the application of the glair, or other size and varnish, and either before or after the application of the octo-nitro cellulose may be stamped or embossed to imitate the texture and appearance of silk goods.

INDIGO PRINTED CLOTHS.

According to this invention, cloths are printed with a soluble solution of indigo: this is fixed by the compound action of air and water. The solution is prepared in the following manner:—1 lb. of indigo is ground in water, to which is added 3 lbs. of caustic soda, stirring till the soda is completely dissolved, and 1⅛ lb. of zinc powder is then added by degrees. When the zinc is dissolved, more caustic soda is put in, until the yellow solution produced will remain yellow, when its surface is exposed to the air for, say, five minutes. A mixture of gum water and soda solution is added, until the mixture becomes a gummy paste. With this solution, unprepared cloth is printed upon by any suitable machine, and the cloth, after it has been printed, is led over rollers in such a way as to expose it to the air, which partially oxidizes the indigo, and thus more or less fixes it. The cloth is carried in front of a perforated water pipe, so that jets of water are thrown against it. It is then led up and down through water tanks, and between the tanks it is exposed to the air for about half a minute. The water jets may be omitted. After the indigo has been thoroughly oxidized in this manner, the cloth is led through an acid bath, by which the superfluous material is removed, and it is then treated with soap and water, and washed and dried in the ordinary manner. When it is desired to colour the whole of both surfaces, the cloth may be run through an ordinary indigo vat, or through a vat containing the above mentioned indigo solution, weakened to the desired tint by soda gum solution, and various new effects may be produced by the use of such a vat in combination with the above mentioned printing process. Thus the cloth, after having been printed and exposed to air and cold water, as above described, is run through the vat, and again treated as before, the result being that the portions printed upon receive a second coating and become darker, whilst the unprinted portions of the face and the whole of the back are dyed a lighter shade. In this process, as well as in the simple printing process, two or more printing rollers may be employed, printing with solutions of different strengths.

PLUSH FABRICS.

This invention relates to the manufacture of plush fabrics. Plush fabrics having a double pile of silk, wool, linen, jute, or any other textile material could, until the present time, only be made on hand looms or on power looms provided with means for automatically inserting the wires. As, however, the insertion of the wires in power looms requires great care and, therefore, much time, and as the wires must be inserted alternately above and below, the said looms have to be operated at a very slow speed, and the production is, consequently, very small. Besides, the fabrics, more especially those of great breadth, which are produced by the aid of such wires, cannot be made of any desired fineness and length of pile, since the wires must possess a certain degree of rigidity and, hence, a certain length and thickness, thus limiting the degree of fineness of the fabric. According to this invention, two grounds are woven at the same time, similarly to double cloth, and the wires are dispensed with, which enables the loom to be operated at a higher speed than before, and of any desired fineness of fabric and length of pile to be obtained. In the different modes of binding, described below, the pile is formed in a similar manner to that of double velvet fabrics, by alternately interweaving the warp into the upper and into the lower grounds. The improved method consists in passing the pile warp round a removable pick before it crosses from the one ground to the other, which is not otherwise connected with the grounds, and is designed to be drawn out after the two fabrics have been severed, in order to draw the end portion of the cut pile warp, which has been passed round the same, to the back of the fabric, where it will then form a second pile. In the accompanying drawings, Figs. 1, 1^a, and 1^b, illustrate the simplest mode of binding for the said fabrics. Fig. 1 shows the fabric in a section taken in the direction

of the warp. The numbers 1, 2, and 3 denoting the consecutive order of the picks of weft. Three picks are alternately inserted for the upper and for the lower ground. Of these picks, 1, 2, 4, and 5 are picks of ground, whilst 3 and 6 are removable picks, whereby part of the pile warp is drawn to the back of the fabric. The last named picks do not bind into the ground, but float, and are merely held by the pile which is to be subsequently drawn out. Fig. 1^a shows the fabric before the removable pick is drawn out, and after the two fabrics have been severed. Fig. 1^b shows the finished fabric after the removable pick has been drawn out, and Fig. 1^c explains the treading. If, in this mode of binding, the material used for the pile be very rough, two adjoining ends of the cut pile warp are liable to be drawn out together with the removable pick. In order to obviate this inconvenience, the mode of binding, illustrated in Fig. 2, is used, which differs from the mode illustrated in Fig. 1, by an additional pick of weft being inserted between the two adjoining portions of the threads which are to form the pile. Figs. 2, 2^a, and 2^b illustrate the principal stages in the formation of this binding. Four picks are alternately inserted in the upper fabric and in the lower, the binding of the warp and pile are altered accordingly. The treading of this method of binding is explained by Fig. 2^c. In case the material used for the pile be very smooth, so that the entire pile is liable to be drawn out with the removable pick, the mode of binding, illustrated in Fig. 3, is employed, which is a modification of the method. Fig. 3 illustrates the binding of the pile, and Fig. 3^a the binding of the warp. Both warps are below the pick 1 and above the pick 2, thus causing these picks, and also the picks 5 and 6, to be laid one on the top of the other, so that the pile will be more firmly held, as shown in Fig. 3^b.

The German Consul-General at Shanghai advocates the establishment of a sample wharehouse in Shanghai, in the interest of German trade. He says that a sample warehouse would form a central point for bringing before the eye the samples in a rich selection, an advantageous setting out, and a clear grouping. Intended primarily for the mercantile community, the warehouse could be accessible to the great consuming public, and it would thus afford to the latter the opportunity of comparing the goods offered to them in the sample warehouse with those of other countries, and allow them to form their own judgment, and in this way give an incentive to the choice of a German source of supply. Owing to the risk, the single merchant seems less inclined to introduce novelties and unknown articles to the notice of his customers. It would, however, be one of the principal tasks of the sample warehouse to exhibit those articles which have, so far, not obtained a footing in China, as, for example, mechanical contrivances, machinery, and other achievements of modern mechanical skill, either as models or in their natural size, to explain their application by ocular demonstration, and so prepare the way for their speedy introduction. The Consul-General, assuming a three years' existence of the enterprise, reckons the cost at 100,000 marks, including the travelling and erection expenses. This, of course, does not take into account the expenses for production and freight of the articles exhibited, which would be borne by the different exhibitors.

Personal and Trade Notes.

The new Russian duty upon English cotton, referred to some few weeks ago, was promulgated recently, and is to take immediate effect.

The Balderstone Mill Co., Ltd., was registered on the 12th ultimo, with a capital of £20,000, in £5 shares, to acquire the Balderstone Mill, Rochdale.

Mr. Nathan Meanock, fustian cutter of Gravel Hole, has added to his branches at Congleton, Crewe, Shaw and Royton, another "cutting" factory at Rochdale

The will of the late Mr. Henry Willis, of the firm of Willis and Pugh of Worcester, has been proved at £37,447 4s. 1d., out of which he bequeaths to various charitable institutions £620.

Messrs. Wm. Hollins and Co., Ltd., Fletchergate, Nottingham, have acquired the merino spinning mills at Via Gellia and Cromford, founded by Mr. C. Hill, of Bridgehouse, who still retains an interest in the business.

The first cotton factory erected in Constantinople was opened recently. 9,000 spindles will be at work in August, and it is believed that cotton yarn will be produced 15 per cent. below the cost of the English article.

Messrs. Norton Bros. and Co., Ltd., have, in consequence of the profits of the business having decreased, given up, for the benefit of the shareholders, 2,500 of the shares allotted to them. These shares represent a sum of £17,500.

Wellington Mills Company, Huddersfield, has been registered, with a capital of £400,000, to carry on business as woollen manufacturers and merchants, and to deal in flax, hemp, jute, cotton, silk, and other fibrous substances.

The Yew Mill Company, Limited, was recently registered, with a capital of £80,000, in £5 shares, to erect a cotton mill or mills, weaving sheds, warehouses, engine-houses, and to carry on business as spinners, bleachers, dyers, &c.

The death of Alderman John Burton, J.P., of Nottingham, occurred at his residence on the 2nd ultimo Mr. Burton has been connected with the lace trade all his life, and was one of the best known manufacturers of all kinds of silk goods.

The whole of the five large Galloway boilers supplied by Galloways, Limited, Manchester, which provide all the steam required in the Edinburgh Exhibition, have been purchased by the North British Rubber Co., for their Castle Mills, Edinburgh.

Sir Henry Mitchell has, recently, been presented, at the Bradford Technical College, with a fine portrait of himself, which has been painted by Mr. Ernest Sichel, and an illuminated address, in token of appreciation of his services to that institution.

Martin, Sons, and Co., Limited, have been registered, with a capital of £300,000, in £100 shares, to acquire the business of woollen manufacturers and merchants, carried on under the style of Martin, Sons. and Co., at Lindley, near Huddersfield, and Halifax.

Messrs. G. H. Holden and Co., late of Carr Street, Blackfriars' Street, Manchester, have removed into new and more commodious premises, where they will have greater facilities for business. They will be pleased to receive their clients at the Commercial Ironworks, Knott Mill, Manchester.

A new Carpet Manufacturing Company, Limited, has been formed by the union of two firms of the highest standing in the trade, that of Messrs. R. Smith and Sons, carpet and rug manufacturers of Kidderminster and Stourport, and that of Messrs. Morton and Sons of the New Road, Kidderminster.

The Eagle Spinning Company, Limited, Rochdale, was registered on the 7th ultimo, with a capital of £90,000, in £5 shares, to purchase the Greenfield Mill, situate at Lower Place, Balderstone, near Rochdale. The number of directors is not to be less than five, nor more than seven; qualification 100 shares.

The fifteenth annual exhibition of work done by the students in the textile department of the Yorkshire College has recently taken place. It consists of examples of design and of woven samples. Taken as a whole, it is said to be an exhibition of which both the students and their teacher, Professor Roberts Beaumont, may be proud.

The German Industrial Floating Exhibition—that is, the scheme for sending a vessel laden with samples of German manufactures round the world—seems to be regarded with growing favour. The number of exhibitors already reaches 500. Some of the principal firms of South Germany and Silesia have, within the last few days, applied for space.

Mr. S. C. Lister, chairman of Lister and Co., silk manufacturers, Bradford, has, it is said, purchased the Acton Manor estate and coal mines, between Normanton and Pontefract. The price to be paid is £180,000. There are 1,100 acres of land with coal beds, including the well-known Stanley Main and Haigh Moor seams. The Lister Mills use abont 200 tons of coal per day.

Sir Elkanah Armitage and Sons, Limited, Manchester, was registered on the 11th ultimo, with a capital of £150,000, in £10 shares, to acquire the business of cotton spinners, manufacturers, and merchants, carried on by the company of the same title (incorporated in 1881), at Pendleton and Patricroft (Barton-upon-Irwell), Lancaster, and at 48, Mosley Street, Manchester, and London. The number of directors is not to be fewer than five nor more than eight.

Messrs. Cox of Camperdown Jute Works, Lochee, have just presented Dundee with a fine public park. The ground lies between Ancrum Road, Lochee, and Balgay Hill, and is 25 acres in extent. It has been bought for the trustees at a cost of £400 per acre, or a total of £10,000. Messrs. Cox have set aside £3,500 to meet the cost of erecting the enclosing wall and the lodge, and an endowment fund of £2,500 has been formed for the upkeep of the park, and to pay the wages of a park ranger.

Mr. John Cheetham, silk spinner, died at his residence, Longroyde, Rastrick, at the age of 56 years. He commenced business in partnership with Mr. Richard Kershaw of Crow Nest, and afterwards established the well-known firm of Ormerod Bros. and Cheetham. On the dissolution of that partnership, some ten years ago, Mr. Cheetham founded the firm of Messrs. John Cheetham and Sons, silk spinners, Calder Bank, and Snake Hill Mills, Brighouse

The Whalley Abbey Printing Company, Limited, was registered on the 28th May, with a capital of £120,000, divided into 2,400 shares of £50 each, to take over the business of calico printer, carried on by Mr. Bryce Smith, under the style of the Whalley Abbey Printing Company, at Barrow, parish of Whalley, Lancashire. Mr. Bryce Smith is appointed governing director, at a salary of £300 per annum, while he continues to hold £20,000 in shares. The number of directors is not to be fewer than two, nor more than seven.

The Board of Trade has appointed the following gentlemen to be a committee to consider the approaching expiry of various European commercial treaties, the probable effects upon British trade of such expiry, and the arrangements which may be made in lieu of these treaties, and to report thereon from time to time, to Her Majesty's Government:—Mr. Mundella, M.P (Chairman), Sir Isaac Lowthian Bell, Sir William O. Ewart, Sir Joseph Lee, Colonel E. S. Hill, M.P., C.B., Mr. C. M. Kennedy, C.B., Mr. C. E. Bousfield, Mr. Frederick Brittain, Mr. R Giffen, and Mr. David Guthrie. The Board of Trade have appointed Mr. A. E. Bateman to be secretary to the committee.

Mr. Benjamin Rhodes of Heckmondwike died at his residence, Ings Road, in the seventy-third year of his age. He commenced business as a card manufacturer, but subsequently embarked in the blanket trade—the staple industry of the town—in which he developed a large and successful business. He erected Moorfield Mills, which were afterwards owned and occupied by one of his sons. Latterly, and prior to his health breaking down, he had assisted in the business of his sons, Albert Rhodes and Co., Spen Vale Mills, but ill health had incapacitated him, and he expired, after a lingering illness. His death is deeply regretted by a large circle of friends and acquaintances.

Under the style of "Haslams, Limited," a private company has just been formed to carry on the two well-known Manchester firms of Messrs. John Haslam and Co., Limited, and Messrs. Lowe, Latham and Co., 109, Portland Street. The nominal capital is £250,000, in shares of £10 each. It is expected that the directors will be Messrs. J. W. Scott (chairman), W. Haslam, R. E. Haslam, W. Lowe, and A. S. Latham, all being gentlemen of large experience in the particular branch of business that they are committed to. As separate concerns, both the above mentioned houses enjoyed a good reputation, in home trade and shipping circles, as manufacturers of plain and fancy muslins, fancy cotton dress fabrics, sateens, &c.

Odds and Ends.

Sir William Houldsworth is introducing a bill to amend the Boiler Explosions Act of 1882. Under the measure, the power of inquiry into the explosion of boilers connected with mines was vested in the Home Office authorities, while inquiries concerning explosions of all other boilers are conducted by the Board of Trade. Sir William proposes to do away with this division of authority, and to empower the Board of Trade to inquire into all boiler explosions.

In order to develop the cultivation of cotton in Central Asia, the Russian Minister of Finance has ratified the project of leasing 60,000 deciatines of land (about 162,000 acres) in Turkestan to the Commercial and Industrial Company of Central Asia, in order that it may form plantations of cotton there. The lease is for 90 years. The Company has the privilege of growing, besides cotton, all other plants; it is exempt from any rent during the first 15 years of working. After that period, it will have to pay a rent which will be equal to the land tax collected on Turkestan territory.

A German statistical publication reports that, while the consumption of raw cotton in Great Britain and Ireland up to 1887 was considerably more than that of the whole Continent of Europe, since that year, it has been smaller, and seems to be decreasing. The United Kingdom consumed in 1887, 3,717,000 bales of 400 lbs. each, or 71,500 a week, while the Continent took 3,692,000 bales, or 71,000 a week. In 1888, the United Kingdom consumed 3,822,000, or 73,500 bales a week, while the Continental consumption was 3,848,000, or 74,000 bales a week. In 1889, the United Kingdom took 3,825,000, or 73,560 bales a week, while the Continental mills took 4,121,000, or 75,250 bales weekly.

The Calcutta *Englishman* for the 6th May, says:—The total value of the cotton fabrics imported by sea into India, in 1889, was 2,520 lakhs of rupees, and the returns bring out forcibly the pre-eminence of Bengal as a consumer and distributor of English piece-goods. Calcutta is, indeed, one of the largest emporiums for piece-goods in the world, supplying, as it does, not only the population of Bengal, but of the North Western Provinces and Oudh, the Punjab and Assam. The competition of Indian with English manufacture is far less pronounced in the case of piece-goods than in twist and yarn. As a peasant industry, the manufacture of coarse cloths still survives throughout India, and in every province there are one or more towns noted for some speciality in the finer classes of fabrics, which are now, however, mostly woven from English yarn. How little the coolie spends on his wardrobe may be gathered from the fact that the annual outlay on clothing of the Indian population is Rs. 1-8 per head.

Applications for Letters Patent.

PATENTS.

Beating silk cocoons. Serrel Automatic Silk Reeling Co., Limited, London. 3rd June 8,573
Belt fasteners. R. Parker, Rochdale. 10th June 8,931
Bands and pulleys (metallic driving). J. and H. J. Brookes, and C. R. Garrard, Smethwick. 23rd June 9,691
Belt pulleys. N. Fraser, Glasgow. 25th June 9,842
Colouring matters. J. J. Hart, London. 3rd June 8,541
Carpets (pile), &c. J. Crossley and Sons, Limited, and A. Siret, London. 4th June 8,659
Cutting machine (fabrics). W. Chambers, London. 6th June 8,760
Cutting or scalloping lace, &c. C. A. Town, London. 6th June 8,763
Combing machines (nip mechanism). J. Carroll, Bradford. 7th June 8,815
Cutting cloth machine. C. C. Lindsey, London. 10th June 8,969
Compressing and bal ng cotton. H. Rembert, London. 16th June 9,318
Colouring matters. R. Holliday and Sons, Limited, and T. Holliday, London. 17th June 9,322
Connections between uprights and harness of double-lift open-shed jacquards. R. Wilkinson, Bradford. 17th June 9,342
Decorticating ramie. P. A. Favier, London. 2nd June 8,520
Drawing fibres (apparatus for), &c. W. Thompson, Halifax. 5th June 8,692
Dyeing black pieces. A. North, Bradford. 7th June 8,799
Dyeing with azo colours. R. Holliday and Sons, Limited, and T. Holliday, London. 9th June 8,896
Drums and pulleys. H. Smith, Sheffield. 19th June 9,492
Dyestuffs J. Y. Johnson, London. 19th June 9,537 and 9,676
Designs for card-cutting for weaving. E. Beveridge, Glasgow. 30th June 10,085
Drying fibrous materials. F. Wever, London. 24th June 9,805
Embroidering. L. Muk, M. Kursteiner and E. Janenz, London. 2nd June 8,538
Embroidering. R. Weiss, London. 4th June 8,669
Embroidery. A. Meizer-Kreis, London. 26th June 9,922
Fibres (preventing) from wrapping the drawing-off rollers of combing machines. J. L. Halliday and L. Shore, Keighley. 19th June 9,495
Fancy fringes (headings of). R. Lee, London. 24th June 9,756
Ginning. R. S. Burn, Stockport. 19th June 9,486
Humidifying air in mills, &c. J. Rothwell, London. 11th June 9,021
Humidifying air in mills, &c. F. and C. E. Wilkinson, Manchester. 25th June 9,850
Humidifying air. J. Mosely, Manchester. 27th June 9,959
Jacquard machines. A. and W. Flather and D. Wright, Bradford. 16th June 9,281
Jacquard machines. H. W. Rice and S. C. Smith, Nottingham. 17th June 9,348
Knitted fabrics. E. Attenborough and T. Mottershaw, London. 5th June 8,715
Knitted vests and machinery. J. H. Woodward, London. 26th June 9,935
Knitted ribbed fabrics. F. Jackson, London. 28th June 10,041
Looms (swells of shuttle boxes). E. Cooper and J. Ormerod, Halifax. 4th June 8,627
Lace (twist or bobbin net). J. R. and E. W. Topham, London. 4th June 8,662
Looms (shuttle changing mechanism for). R. A. Whitlan and J. Kincaid, Glasgow. 5th June 8,693
Looms for chenille for carpets, &c. A. Archambault, London. 7th June 8,846 and 8,847
Lace machine (moving bars in). R. Scott, Nottingham. 11th June 9,018
Looms. J. Heintzenberg, London. 12th June 9,117
Looms (vibrating shuttle tongues). J. Waddington, Bradford 14th June 9,204
Mule (tin roller brake for self-actor). J. Nelson and S. Shaw, Failsworth. 5th June 8,690
Mill appliances. G. F. McCleane and W. M. Faber, Liverpool. 20th June 9,592
Moistening and supplying fresh air to factories. W. M. Porter and A. L. Lewis, Belfast. 23rd June 9,704
Operating the rising and falling, revolving, or other, moveable shuttle boxes of looms. J. Cowburn and C. Peak, Manchester. 21st June 9,636
Printing or dyeing with several colours. W. L. Wise, London. 7th June 8,809
Pressing woollen, &c., fabrics. J. Reffitt, London. 7th June 8,810
Pegs (securing) in shuttles. T. Rollinson, Huddersfield. 7th June 8,877
Printing lines and figures on shirt-fronts, &c. A. Bruce, London. 20th June 9,608
Picking straps and manner of attaching them to pickers. F. W. and T. Wilson, Halifax. 24th June 9,759
Pickers. J. Rowe, Clitheroe. 27th June 9,971
Quilts, &c. L. Bendix, London. 14th June 9,252
Reels or frames for pile, &c., fabrics. C. Longbottom, Bradford. 4th June 8,637
Spinning machines (preventing uneven twisting). J. Smith, Keighley. 2nd June 8,496
Shawls (weaving double reversible) and apparatus. E. Turner, Huddersfield. 6th June 8,734
Stopping machinery. S. H. Brooks, London. 11th June 9,028
Spinning (ring) and twisting. W. H. Simpson, Keighley. 12th June 9,070
Scutching machines. S. W. Wilkinson, Manchester. 16th June 9,262
Spindles of spinning and twisting machines. E. De Pass, Manchester. 16th June 9,296
Spools for spinning, &c. A. J. Boult, London. 17th June 9,380
Steaming, boiling and disinfecting fabrics and fibres. T. Mellor, Halifax. 18th June 9,430
Shearing wool, hair, &c. G. G. M. Hardingham, London. 18th June 9,473
Shuttling motion for looms. S. Walker and G. Leek, Radcliffe. 20th June 9,585
Spindles of spinning and twisting machines. H. Parker, Keighley. 23rd June 9,702
Stockings and socks. M. D. Styles, London. 23rd June 9,714
Spinning fibres, and apparatus. G. J. J. Hoffmann, Bradford. 24th June 9,834
Stockings and socks. J. and W. Harth and W. H. Willis, London. 26th June 9,927
Shuttle boxes of looms (appliances connected with), R. and T. Ingham, Halifax. 28th June 10,005
Spinning and winding fibrous materials. C. K. Mills, London. 28th June 10,011
Tentering machines. A. Bradbury, London. 14th June 9,223
Typographic machines for printing and folding textile fabrics. M. Smith Manchester. 21st June 9,627
Winding spool bobbins for looms and apparatus. J. Whitely, London. 6th June 8,751
Winding cord, twine, &c. J. P. Bayly, London. 7th June 8,857
Winding yarns, &c., from hanks. W. H. Baldock, London. 14th June 9,256
Winding wash-greys, or back cloths, used in printing fabrics. G. B. Behrens and J. C. Watson, Manchester. 18th June 9,417
Winding frames. T. Guest and T. Brookes, Manchester. 20th June 9,576
Weaving rectangular mesh-netting. H. A Rendal, Bridport. 21st June 9,630
Waterproofing by one treatment. J. and J. Miller, London. 23rd June 9,711
Wire healds. L. V. Pross, London. 30th June 10,073
Yarn from warp beams in looms. W. Sutcliffe, London. 2nd June 8,490
Yarns (coloured). E. and G. E. Sutcliffe, Mirfield. 5th June 8,689
Yarn-sizing machine (copper rolls for). T. Winter, Halifax. 12th June 9,071

Patents Sealed.

18,614	5,560	6,365	7,058	7,074	7,588	8,106	8,127
8,688	8,930	9,235	9,337	12,549	2,714	3,182	4,850
9,186	9,326	11,000	17,147	17,622	3,270	3,357	3,465
12,299	4,565	6,598	7,802	7,857	7,888	8,261	9,149
9,458	9,548	9,612	9,669	10,354	11,762	1,972	3,846
6,519	7,364	8,107	9,566	9,889	9,957	12,279	13,755
3,018	3,095	3,668	3,686	4,048	4,244		

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Contents.

Notices.

The Yearly Subscription—payable in advance—including home postage, is 10s. Cheques and Post Office-Orders to be made payable to H. & R. T. Lord, 10, Ann Place, Little Horton Lane, Bradford, Yorkshire.

The Publishers will be happy to receive intimations of New Inventions, Patents, &c.

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To prevent any misunderstanding, all Articles sent to the *Journal of Fabrics and Textile Industries* for publication will be considered as offered *gratuitously*, unless it is stated explicitly that remuneration is expected

Readers are invited to forward items of interest to the Trades concerned.

The Proprietors will feel greatly obliged if any of their readers, in making enquiries of, or opening accounts with, Advertisers in this paper, will kindly mention the *Journal of Fabrics and Textile Industries* as the source from whence they obtained their information.

Analysis of Fabrics.

When it is required to produce a fabric from a small sample, it is very difficult to estimate the weight, counts of warp, and counts of weft, by means of comparison with known cloths, unless the designer has had a large experience in judging of weights by the handling, and of counts by comparison, and even then the appearance may be deceptive on account of the different styles of finishing, and the varied means of interweaving the threads. As, for example, we might have two cloths of the same build and weight, but one finished hard and cut clean on the face, while the other is heavily raised—back and face. The raised cloth would feel thicker and heavier than the one clean finished, and, again, in judging yarns by comparison—if one yarn is hard twisted and another soft twisted, the soft twisted yarn would appear thicker than the hard twisted for the same weight; also, if the yarns are of different colours, the colours will materially affect the appearance. If, for instance, we compare a red thread and a blue one together, we should find that the red thread appeared thicker than the blue one, as red is an advancing colour, that is, it appears to advance towards us, while the blue has an opposite effect—that of retiring, so that we may conclude that this system of analysing cloths, either for reproduction or ideas in build of cloth to suit a given pattern, is liable to error, even in the hands of an accomplished designer. What we require, then, is some system whereby we may determine at once how the cloth is built up. This is best done by means of delicate scales, or, what is known as a chemical balance, one that will turn readily at a grain, or one-tenth of a grain troy. Another difficulty will here present itself, viz.:—that in using grains troy, we have a system of weights different from that in which the weight of the cloth is given, and different from the system of denominating yarns, which are invariably denoted on the avoirdupois weights. It might not be out of place here to point out how the troy grain is made to agree with the avoirdupois system of weights. As is well known, the lowest denomination to which the avoirdupois weights go is drams, and there are 16 drams to one ounce, and 16 ounces to one pound, or, 256 drams to one pound.

One authority says that, for the convenience of people who buy goods in large quantities by avoirdupois weight, and sell them in small quantities by troy weight, the pound avoirdupois was declared by statute to be equal to 7,000 grains troy. Another authority states that the pound avoirdupois was fixed in the reign of Elizabeth, and is equal to 14·6 ounces troy, and contains 7,000 grains troy, so that it is to a troy pound as 7,000 is 5,760.

In dealing with woollen yarn spun on what is known as the Yorkshire skein count, dram avoirdupois is the simplest form of weight, as the counts of yarns are indicated by the number of skeins of 256 yards each in one pound, that is, 1's woollen on this system indicates that there are 256 yards in one pound, or one yard is one dram, therefore, if we had 20's woollen, we should have 20 skeins, or 20 times 256 yards in one pound, or 20 yards in one dram, therefore, whatever the counts are, we understand that, for the convenience of testing, we have that number of yards per dram, which is a very satisfactory means of testing, as well as being very easy of application. If it is worsted yarn we are testing, we shall find the dram system a very laborious one, as we should have a fraction of a dram for our testing weight, worsted counts being indicated by the hanks of 560 yards contained in one pound. If we divide 256, the drams per pound, by 560, we should get as the weight ·457 as the standard weight, and even at three places of decimals it will not come out, it being an interminable decimal, but, by resorting to the grain weights, and dividing 7,000 by 560, we get 12·5, or whatever number of yards of worsted weigh 12·5 grains, that number of hanks weighs one pound and indicates the counts. In the same way, in dealing with cotton yarns, we have the hank containing 840 yards, and this, divided into 7,000, gives us 8·3 grains as our standard weight, the three being a recurring decimal; and again, in testing cotton yarns, whatever number of yards of yarn weigh 8·3 grains, that number of hanks will be in one pound weight, and will indicate the counts.

Having shown how the various yarns are indicated and tested in small quantities, we will now show how a small quantity or piece of cloth may be analysed so as to find what is the weight per yard and what the counts from which it is made. We will take, as our first example, a worsted cloth which is two inches square. If we weigh this carefully, we find that the four inches (the area of the pattern) 14·3 grains and one yard of the finished cloth is 36" × 56" or 2016"; therefore, if four inches weight 14·3 grains, how many grains will 2016" weigh? This is only a question of proportion, and we find that 2,016 will weigh 7,207·2 grains, and if there are 7,000 grains in one pound, and 16 ounces in one pound, by dividing 7,000 by 16, we get 437·5 grains in one ounce; therefore, if one yard of cloth weigh 7,207·2 grains, by dividing 7,207·2 by 437·5, we shall get the weight in ounces, which, in this case, is 16·4 ounces; this being the weight of a finished yard of cloth. Then, to ascertain the counts of the yarn—we begin by taking out 18 threads of warp, which, being 2" each, will give us one yard of warp, which we find weighs ·69 grains. This divided into 12·5—the standard weight in grains—gives us 18, the counts of the warp, and on counting the ends per inch, which we find to be 120, we make the calculation to find the weight of warp per yard by the ordinary formula of multiplying ends per inch by inches wide × 16—the ounces per pound, so as to reduce the weight to ounces, and divide by 560—the yards per hank, and by 18—the counts of yarn, or to put it into formula as follows:— $\frac{120 \times 56 \times 16}{560 \times 18} = 10{\cdot}66$ ounces per yard. Then proceed in the same way to find the weight of weft. We find that one yard of weft weighs ·64 grains—this divided into 12·5 gives 19·5 as the counts of the weft; and we have 72 picks per inch—which, by using the formula of multiplying picks per inch by inches wide, and by 16 to again reduce it to ounces, and dividing by 560—the yards per hank, and by counts, gives us 5·9 ounces as weight of weft, or by formula $\frac{72 \times 56 \times 16}{560 \times 19{\cdot}5} = 5{\cdot}9$, then adding the two together, we get $10{\cdot}66 + 5{\cdot}9 = 16{\cdot}56$ ounces per yard, and as the weight of cloth by weighing was 16·4, we have an error of ·16, or about one per cent., which is due to the loose fibres flying away in pulling out the yarn.

We will next take a solid woollen cloth, where we have $3\frac{1}{2}" \times 3\frac{1}{2}"$ of cloth, or 11·25 square inches This weighs 41·3 grains, therefore, if 4·25 inches weigh 41·3, what will 54 × 36 inches or 1944 square inches weigh? (this cloth being finished 54 inches). This we find, by proceeding in the above manner, to be 15·3 ounces, and, to ascertain the counts, we take out four threads of warp. This is a difficult process, owing to the milling. The weight of the four threads of $3\frac{1}{2}"$ each, or 14 inches, is ·54 grains, therefore, if 14" weigh ·54 grains, what will 36", or one yard weigh? This, we find, is 1·39, and this divided into 27·34—the standard weight of grains for woollen, gives 20, nearly, or the warp is 20 skeins, and we find, by counting, that there are 48 ends per inch, or by formula $\frac{48 \times 54 \times 16}{256 \times 20} = 7{\cdot}1$ ounces, then proceeding in the same way with the weft, we find 14" or four threads weigh ·59 grains, and one yard weighs 1·52, and this divided into 27·34 gives as this count 18's, or 18 skeins to the pound, and there are 44 picks per inch, therefore, $\frac{44 \times 54 \times 16}{256 \times 18} = 8{\cdot}2$ ounces, and $7{\cdot}1 + 8{\cdot}2 = 15{\cdot}3$. By working out the calculations in this way, one acts as a check upon the other, and enables us at once to detect any inaccuracies in the working.

In the same way, if we had fancy twist yarns, by weighing what was the counts of the thread as a whole, and then by untwisting a few of the threads and re-weighing them separately, we could say with certainty how the threads are built up and what are the

counts of each separately, whether of the same or of different materials: and in dealing with stripes and checks, where different sizes of yarns are employed, we should ascertain how many patterns were contained in the width of the cloth, and by getting the total number of ends of each kind and proceeding in the above manner, we could tell at once what was the weight and build of the cloth, or, instead of taking them separately, we could find the average counts ot the warp and deal with it as a simple quantity. It might not be out of place to give one example.

We have a cloth before us of the following pattern, viz.:—

1 end Twist worsted.
1 „ Blue „
1 „ Twist „
3 ends Red „
6 „ Black cotton.
6 „ „ worsted.
6 „ „ cotton.

and the weft all black worsted, but pick and pick of different counts. We find that $3\frac{1}{4}" \times 2\frac{1}{2}"$ of cloth, or 7·3", weighs 30·65 grains, and $56" \times 36" = 2016" = 19$ 3 ounces.

And 24" worsted warp	= ·47 grains	= 13's worsted.
„ 12" twist	„	= ·40	„	= 10's „
„ 54" cotton	„	= 2·00	„	= 6 2 cotton.
„ 18" face weft	„	= ·47	„	= 13's worsted.
„ 18" back „		·57	„	- 11's „

The red, blue and black worsted warp being the same, there are 200 patterns in the width, or 56 inches, therefore,

200 patterns × 2 ends twist	= 400 ends	10's worsted	= 1·1 ounce.
„ „ × 10 „	= 2,000 „	13's „	= 2·8 ounces.
„ „ × 12 „	= 2,400 „	6·2 cotton	= 7·3 „
32 ends per inch, 11's worsted			= 4·6 „
„ „ „ 13's „			= 3·9 „
			19·7 ounces.

or an error of five per cent., probably due to fractions. To reproduce the cloth, we should take the total ends in the finished state, and spread them out to, what our experience would teach us, the width the cloth had originally been, and add on the counts of warp and weft according to the shrinkages that had taken place, bearing in mind what it might have lost in finishing, and not forgetting that the counts given above are in the finished state and, in most cases, thicker than they originally were. No definite information can be given as to what a cloth will have shrunk and lost in weight in finishing, as it is affected in so many different ways, and experience only can teach us this.

Analysing for the pattern is best done by picking out a few threads, so as to leave a fringe, and then cutting a small quantity of this fringe away, so as to ensure beginning at the same point with each thread examined. If, having got this fringe and the small space, we push one of the threads away from the body of the cloth and examine the interweaving carefully and note it down, we can then take the next and place it alongside the first, and we shall have, in most cases, the basis of the pattern, from which we can build it up without destroying any more of it. Of course, this entails, on the part of the designer, a knowledge of the various systems upon which patterns are made. And we have no hesitation in saying that, if he cultivate the habit of carefully following out the above instructions, he will have a ready means of analysing patterns for reproduction, or for ideas for new patterns and new cloths, which will be both entertaining and instructive, and will give him ideas of the build of cloth suitable for new and original designs.

British Trade in Woollens with Beyrout.

The Acting British Consul-General at Beyrout says, in his last report, that the import of woollens from Great Britain is, according to the report of 1888, largely on the increase, but it was probably considerably under-estimated that year. Still, British woollen goods have a firm footing in Beyrout on account of their cheapness, and it may be expected that they will come to the front still more, as cheapness is the greatest desideratum in this country, quality being altogether a secondary object. France, Austria, and Germany, therefore, which import a higher class of woollen goods, are falling into the rear, and the value of their united imports may amount to about 45 per cent. of the total. French woollen goods are of far too high a quality to find a ready sale in this country, and are imported in smaller quantities every year. Germany still makes headway with flannels, but is losing in cloth — Austrian cloth being cheaper. Austria has a monopoly of fezzes, and is increasing its imports of cloth, but, on the whole, Austrian woollen imports are falling off in value. British woollens, also, though increasing in volume, do not increase proportionately in value.

Commercial travellers in Tasmania pay no license fee, and no distinction is made between them and other importers, except in regard to small quantities of tobacco as samples, which the ordinary importer is prohibited from introducing into the colony. All cut patterns, of no value except as samples, are admitted free of duty.

Microscopic Study of Fibres.

THE OIL IN COTTON.

The gloss of cotton fibres, as shown in our last article, increases with its lightness of staple, or with the failure of the plant, during growth, to deposit its juices as a lining to the central cavity. It is thus always a direct result of the conditions of growth and ripening, and can neither be increased nor greatly lessened by any of the operations of gathering, ginning, or baling. It is not entirely thus with the oil contained in the commercial fibre. A certain proportion, or amount, of oil seems, indeed, to be inherent in the fibre. Water will not filter through raw cotton, nor will cotton be wetted if placed upon water, until, by capillary attractions, the fluid is drawn into the central cavity. When pushed below the level of the fluid, it gradually becomes wetted, but it does so in a manner which shows that it is not the air contained in the mass alone which resists the approach of the fluid. Now, it is easy to see that, in some operations and in some dyeing processes, this uniformly distributed oil is no disadvantage, and may even be of positive use. For, as in the similar case with wool, it softens and strengthens undyed fibre, and gives permanence to the dye when properly mordanted.

MICROSCOPIC APPEARANCES.

To show this characteristic oil with the microscope is a rather more difficult operation than are most of those needed in microscopic work with fibres. Those who are familiar with the study of cotton, will, of course, easily see in the opacity or clearness of the edges of the fibre when it is immersed in water, or, better, in Farrant's fluid, the presence or the absence of the oil. For, as the fibre is not evenly wetted, even after prolonged immersion, the fluid never seems to come into absolute contact with the tissue of the fibre itself, but to lie away at a slight distance from the edge. Thus, a dark band occurs both at the outside edges of the fibre and also at the lines which mark the limit of the central cavity. There are, however, no air bubbles nor any other globular appearances present, when the oil is evenly distributed. Now, taking Farrant's as our standard fluid, it is easily shown that, of two cotton fibres immersed in it, that containing the most oil has the darker outlines, and, further, that the depth of outline is nearly in direct proportion to the amount of oil contained. Thus, *when once trained*, the observer has no difficulty in determining very accurately the comparative amount of oil in any number of samples of fibre submitted to him.

PREPARING STANDARDS.

But, for the purpose of rendering the test as accurate as possible, it is best to make a series of reference slides. This is done as follows:— Take, first, a small sample of cotton, of the grade the worker uses most, and wash it thoroughly in ether, to remove every trace of oil. The fibre, thus washed, is to be mounted permanently in Farrant's fluid. It will form the standard sample, free from oil. Examined under the microscope, it will be found very clear and transparent, both throughout the body of the fibre, and at its edges, as well as at the lines which limit the interior cavity. By comparing it with other unwashed samples mounted in the same kind of fluid, the difference is at once seen. Now, select a series of samples from those lots of cotton which have been proved in use to have the proper amount of oil in them to give the best results. Mount them carefully in Farrant's fluid, on separate slides, with their peculiarities of working in each case noted, preferably, in a note book, while the slides themselves, beginning with the one washed in ether, are numbered from one, upward. By this method, the manufacturer has a working line of tests with which to compare every new lot of cotton that is obtained for work. It is obvious that this is a kind of work which is best done by the one who uses the fibre, or, at least, the specimens must be selected by him for the mounter, for nowhere does the theoretical knowledge of the mounter receive so great aid from the practical knowledge of the cotton worker as here.

LOCAL OIL.

We see thus that oil is an essential and valuable constituent of cotton. Without it the fibre is harsh and brittle. A suitable amount of it, evenly distributed, gives strength and pliancy. Yet, the worker sometimes finds that, just as in the case of wool, it may be in local excess. Not unfrequently stains occur in finished goods which are due solely to the excess of oil in spots through the tissue. These are readily accounted for, and still more readily found, by the use of the microscope, before the fibre has been worked up. It often happens that seeds do not get removed as they should, but, being few in number, are not noticed in the examination of the sample, before working. In such cases, the oil is not evenly distributed, but is in great excess where the seeds have had their oil expressed into the mass of fibre in baling. This excess of oil assumes, under the microscope, when the fibre is examined in Farrant's fluid, the appearance of globules. These oil globes lie along the outside of the fibres from end to end, and, where two fibres cross each other, often occupy both the acute angles of the junction. From their globular and angular positions and form, they are thus easily seen and distinguished from the true fibre oil, which is very evenly distributed, and never becomes detached into globes, in this method of examination. The presence of these globes, then, indicates that the cotton must undergo the most thorough washing, that all this excess may be removed before dyeing or printing.

LOSS OF DYE IN CARDING.

In this paper we shall study the loss of colour on dyed cotton. It will be well to divide dyed cottons into two groups for the purpose of this study. The first is made up of all those cottons in which the dye is precipitated upon the outside of the fibre and also within its cavity, in the form of a thin film, by a strong mordant. These, which are the ones generally met with in our mills, may be called surface-dyed fibres. The second includes all those samples in which the dye is absorbed by the material of the fibre itself, and afterward set by a good mordant. In this case, it is not a surface deposit, but a body dye, and though a few granules may sometimes be found within the cavity, the general appearance under the microscope is that of a perfectly clear, even, and generally transparent tube, with the colour alike in all the parts. Such cottons are found in those exquisite fabrics from France, which are so justly admired for their brilliancy, and in a few of our own dyed fibres. Taking up a sample of black surface-dyed fibre, we examine it carefully under the microscope, at first while dry, and then while immersed in our usual Farrant's fluid. In the dry state, which is, of course, that in which it goes to the carding machine, it shows a general dark blue tint, not evenly laid on, in some fibres almost wanting, and in others quite dense and dark. In some places, granular deposits, and, in others, cakes of dye cover the larger fibres. Rough handling, by rubbing between the two glasses used to keep the fibres in place under the microscope, removes some of these outside cakes while we look at them. Placing the sample now in our Farrant's fluid, we find the tints everywhere rendered more transparent, but the granules and the cakes of dye are held too firmly to come loose. The general view now shows that the mass of fibre is unevenly dyed; in some places, no tint is perceptible, and, in others, masses of colour appear, which look as though they would be removed entirely by slight force. But, of course, all these extra masses of colour go toward giving the depth of tint to the sample. We now take up our sample of cotton, which has been carded from this especial lot of dyed fibre that we have examined. Taking it first dry, as before, we see at a glance that the fibres are now matted together as in the uncarded sample, but laid into something like a general, wavy, parallel direction, and each fibre is freed from contact with its neighbour. Looking along the sample, lengthwise of the fibres, we see very few of the granular deposits and none of the cakey masses left. Placing the samples of uncarded and carded fibres side by side, under the microscope, we cannot fail to see that the average depth of tint is much less in the carded fibres than in those not yet carded. But this becomes still more striking, when we place them side by side in Farrant's fluid. Those fibres which are free from granular deposit and cakey masses are much deeper in tint in the uncarded than in the carded samples As a second test, we take a sample of uncarded, dark-green cotton, and, examining it as before, find, in the dry state, a tolerably heavy surface coating, more uniform than in our former samples; plenty of fine granular deposits, and but few large cakes, in the mass. Evidently, this sample is much better dyed than the last. The fibres show almost the same colour from end to end, and all the fibres show nearly the same depth of tint. In Farrant's fluid, the difference in depth of tint with different fibres is a little more perceptible, but not nearly so great as in the black sample. The granular deposit and the cakes adhere firmly. Now, taking a sample carded from this stock, we find that some little of the granular deposit has been lost, as well as all the cakes of colour, but no great loss to the general tint is shown. In Farrant's, we see more clearly, by placing the uncarded and carded samples side by side, the total result of the work. The tint has been but slightly lowered on each fibre, but some granules and all the cakes are lost. Lastly, we take a sample of a clear red cotton, of the second or body-dyed class. No deposit is seen on the outside, except a few granules, and the whole fibre, both dry and in Farrant's, is clear and even in tint in any number of fibres. Examining, both dry and in Farrant's, the sample carded from this, we find no change in the main fibre tint, and no loss except the few granules. We infer, from these experiments, and from hundreds of others, made on all kinds of dyes and cards, that the loss of tint in carding is due solely to imperfect dyeing, and that where the mordant has firmly set the colour in thin films, not in cakes or grains, carding removes no colour. But, on the other hand, all badly dyed samples lose heavily in this operation.

LOSS TO DYED COTTON IN CARDING.

We will take up the loss in carding by the dyed fibre itself. Every worker knows that some dyes leave the fibre soft and fleecy, while others render it harsh and hard, and, in some of the harsher forms, even knotty and lumpy. It can hardly be supposed that these two classes of dyed fibre will be treated alike in carding. There will also be a difference between the action of the flat and the worker and stripper cards. Taking up our black-dyed sample, as used in the last article, we find it rather harsh to the touch, and quite knotty. Straightening out the fibres, we count 100 of them, and measure them separately. They are found to average 1.30 inches in length. Eight of them are broken near the middle, and several of them are split and torn by previous operations, many of them are twisted abruptly in the dyeing, and all of them seem stiff and hard. We now take up the sample carded from this stock on worker and stripper cards—carded, we are informed, roughly and rapidly. We pull out and straighten our 100 fibres, and carefully measure them one by one. They average now 1.09 inches. Twenty of them are broken near the middle, a few are split and torn, but not many more, perhaps, than in the uncarded fibres, but very many are broken near the base of the fibre. Fully 20 per cent. have thus lost their soft or weaker end. This shows badly for the effects of this special dyeing, because it makes it clear that the fibre itself has been weakened by the dye. The worker will at once see that, in our method of examining the total results, we fall short of getting at the full loss. We can only measure what we have. Those fibres that are so broken as to fall quite out in the carding process are completely lost to us, and we have no means of getting at their number. So our results must show less loss than really occurs, by just the amount of broken fibres totally dropped out in the carding process. But, as it is, it is bad enough. 12 per cent. are abruptly broken near the middle, and the inner ends lost; 20 per cent. more have an average of 10 per cent. broken from the end, and an average loss of 16 per cent. in length seems to emphasize the special losses. Much better results are shown in the samples carded on flat cards. Out of 100 fibres, only 14 are found broken near the middle, and 10 per cent. at the weaker end. The average length, too, after carding, is here 1.20 inches. We have used this sample because, from its stiff, harsh fibre, it is more easy to show the effects of dyeing in it than it would have been in better-dyed samples. But the influence of dyeing is well shown also in many cases where the fibre is not especially harsh to the touch. We take up a fine light-brown fibre, very smoothly dyed, as seen under the microscope, and without any thick cakes, though dyed by the surface methods. It seems quite uniform in length, only 5 out of 100 fibres being broken badly near the middle. The average length of 100 fibres is $\frac{1}{4}$ inch. Not more than 10 per cent. are split or torn. This, of course, refers to the uncarded sample. We will now examine 100 fibres, after carding on the worker and stripper cards. They average 1.10 inches in length, 15 are broken near the middle, 15 more are badly broken near the inner end, and many more are split and torn. In this case, the fibre has evidently been weakened by the dye, so that it is rendered brittle and unable to bear well the rough treatment of carding. Tested for strength, after spinning into thread, also shows this, for threads of it, No. 36, break with about $\frac{3}{4}$ the weight needed to part an undyed thread, No. 36, spun from the same kind of cotton. It is now in place to take up our soft, fleecy, body-dyed cottons, and see what result they show from the process which has so badly injured our surface-dyed fibres. We select two samples, one a delicate blue, without visible roughness or uneveness under the microscope, and of the same soft tint throughout all the fibres, the other a fine, clear red, with the same characteristic as the last. The fibres, 100 in number, of the first, show only 3 broken near the middle, and but a very few split by previous processes, though a few, 5 or 6, have their weaker ends lost. After carding, we count over 100 fibres again, and find but 6 broken in all, near the middle, and 10 which have lost some 8 or 10 per cent. of their inner end. No splitting or tearing seems to have occurred. The average length of the 100 fibres is scarcely less than before carding. The results with the red sample are almost identical, nothing is lost. The soft, rich fibre has passed the ordeal without harm. In now comparing the loss of dye, as in our last, with the loss to the fibre, as in this article, we cannot fail to note that perfection in dyeing secures both perfection in colour, and character of staple after carding. The great importance of dyeing according to the best methods, only, would seem to be conclusively shown.—*Textile Record.*

Glycerine as a Wool Fibre Preserver.

Mr. J. Perzog, a distinguished French analytical chemist, has discovered a new process of retaining the durability and original resistance of wool thread and wool tissues in cases in which the latter have to be exposed to a heat of 130 or 140 degrees Celsius for manufacturing purposes. At 110 degrees Celsius, neither wool nor woollens alter. When, however, heated to 130 or 140 degrees Celsius, both turn yellow and seem to be combusted. To make wool tissues waterproof, manufacturers have to expose the fabric to 130 or even to 140 degrees Celsius, and it was invariably found that the impregnated tissue had lost all its resistance. It was first thought that certain wools would alter less than others. This, however, proved erroneous, and it was found that all the different fabrics, on which the experiment was tried, showed combustion, to a certain extent, on account of the wool not being able to retain a necessary degree of humidity under the exposure to so intense a heat. Glycerine is known as a substance which greatly prevents evaporation of humidity, and, based thereon, Mr. Perzog saturated several woollen tissues with a solution containing 10 per cent. of Glycerine. The experiment proved absolutely successful. The fabrics in question show not the slightest alteration, and had retained 13 per cent. of glycerine after having been exposed to 140 degrees Celsius. The preservation of the wool fibre is thus assured, and once more science has helped manufacturers of waterproof fabrics over one of the greatest difficulties they have had to deal with hitherto.

Messrs. Robey and Co., Globe Works, Lincoln, had a fine show of their machinery at the Yorkshire Agricultural Show at Harrogate. The various engines, &c., made by this firm, have been noticed from time to time in our Journal, and there is, therefore, no necessity to particularly mention those exhibited further than to state that the firm maintains its character for high class material and workmanship.

Drying Woollen Cloth—Outdoor and Indoor Drying.

The subject now before us, that of drying woollen cloth, is not so simple as it might at first seem. Indeed, it offers many and varied difficulties, which are hardly ever realized by the uninitiated, and which are sometimes only partially understood by manufacturers themselves. It is certainly a singular fact that, notwithstanding all the modern appliances, and all the technical knowledge of the present day, the best mode of drying a wet piece of woollen cloth should still be the one which was known and practised by our forefathers years and years ago. The way in which they accomplished this operation can hardly be strange to the finishers of to-day. Anyone who travels by rail through a manufacturing district, especially where woollen cloths, flannels, and blankets are made and finished, cannot have failed to see the rows of frames in the meadows near the mill buildings. These frames, provided with hooks along the upper and lower laths, and which are supported by upright posts, are exposed to all the influences of wind and rain and sun, and yet, notwithstanding, or, perhaps, better, on account of this, the cloth, which was dried on these frames, had, generally, a better feeling and a more natural and agreeable finish than that which was dried in closed rooms, under the influence of steam or heat. The reason is at once evident. Through the influence of the weather, the cloth dries slowly. This gives the wool time to adjust itself, and, on account of its elastic nature, to assume a natural position on the surface of the fabric. For this reason, when all is dry, the cloth has a more agreeable feeling and a more natural appearance. More than this, the moisture is more evenly carried off in an open meadow, with the assistance of a little wind, and, in this way, the drying proceeds evenly and regularly over the whole length and width of the cloth at the same time. Perfect in its nature and satisfactory in its results as this method most certainly is, it has the great fault of being too tedious and too uncertain to suit the demands of the woollen manufacturer. Artificial heat has, therefore, to be resorted to in order to dry larger quantities in less time. But, together with the use of steam or dry hot air as a drying force, we must need put up with a harsh, unnatural feeling in the fabric, due to a forced adjustment of the fibres during the continuance of the process. This leads us, then, to the two methods of drying woollen cloth—first, by the use of tenter bars in the open air, and second, by the drying mechanism in the finishing room. There has always been more or less diversity of opinion as to which of the methods, when viewed from all sides, is really the best. There are many who claim, as above stated, that a piece of goods which has been dried in the open air will both look and feel better than the same piece dried on a machine. Our previous remarks show clearly that, to some extent, we concur in this view. But, if we may be allowed to advance a personal opinion on the subject, it is that although there is, no doubt, a difference in favour of the old-fashioned method, yet, with our modern methods properly applied, we can attain to such a degree of perfection in this line as to make that difference almost, and in fact, quite, unappreciable. Both methods may be tried on fine work, and yet, if the work is properly done, it is practically almost impossible to detect any real difference as far as the general appearance of the goods is concerned. If the degree of finish is not quite as good with the use of the machine as with that of the bars, there are other considerations which more than make up for this deficiency. Take, for instance, a large mill, where nearly, or more than, a hundred cuts a day are finished and sent away, and we see at once where the dryer is far in advance of the bars. One man with a good machine can quite comfortably dry from forty to fifty pieces a day, without being at all hurried. And he alone is then responsible if the goods are damaged or spoiled by carelessness or bad management. Again, when working with a machine, the goods are more apt to come out uniform and regular in width and in length. This is a consideration of no small weight. Another point lies in the fact that the method of drying by machine is far cheaper than that of open-air drying. It requires neither as much space nor as many hands. It often happens, where there is not sufficient work to keep two men going steadily at the bars, that we must take a gang of men from the wet finishing room when it is favourable for drying outside. This takes a lot of men from their work and, necessarily, hinders and confuses the operation of the department. When a "hurried" piece comes along, one man can easily dry it on the machine in fifteen or twenty minutes, without the least inconvenience, when it would require half a day, or even more, possibly, if it had to be done on the bars. These few points must be evident to all. The time, labour, and expense of the machine method being all less, must commend its adoption, where at all convenient or possible. As regards the method of tentering, we know quite well how that is carried out. The face of the fabric should be placed to the bar, as the nap will not then be so apt to get roughened and spoiled, as when it is to the weather. The cloth must be pulled up taut, so as not to have any wrinkles or slack places anywhere throughout the piece. We might state that there is a patent tenter hook now in the market, which is a great improvement on the old-style hook in more common use. When stripping the bars, the goods come off from these hooks much easier than from the older ones, and, for other reasons, they are more desirable. These hooks come in strips, ten or twelve feet long, and consist of a wooden lath, with a bevelled edge, in which the steel wires or hooks are set out from the under side of the strip. These are much nicer to handle, and one man can tenter twice as fast on them as on the old-style hooks so long in use. The machines which are used for the purposes of drying are constructed in various ways. They consist usually, however, of two travelling chains, between which the cloth is stretched, and under or near which the steam pipes are situated. For some special purposes, iron frames, similar to the old-fashioned wooden ones, are used, and placed side by side in a stove or heated compartment. On these hooks, then, the cloth is fastened, as on the tenter bars above described. But they have this drawback—the upper horizontal bars are *fixed*, and the operatives stand on stages to reach them. Then, when the bottom bars are lowered to stretch the cloth, this stretching proceeds often no further than the middle of the cloth, and the two sides of the piece thus become of unequal thickness and of different feeling. To obviate these disadvantages, a German machinist has invented an arrangement of iron frames for drying by steam or hot air, in which both sides of the cloth are evenly stretched, thus producing a homogeneous fabric. The two rows of horizontal bars of the machine, with the tenter hooks, are carried along vertical columns, which are provided with pulleys at the top and bottom, so that they can be run on rails in and out of the heated room. Through the columns, a horizontal rod is passed, upon which shear arms are mounted, which carry the upper and lower rails or bars. By means of a crank and gearing, these arms can be brought from a horizontal to an angular position, so that the rails are brought nearer together, and the cloth hooked on with perfect ease. When this is done, the arms are brought as far as possible into a more vertical position by turning the handle, and, in doing this, the cloth is evenly stretched from both sides, and with equal tension at both selvages. As the stretching can be done slowly and gradually, even the most sensitive cloth can be brought to a considerable width without the slightest fear of damaging the fabric. By arranging the steam pipes under the frames, the direction of the heat may be adjusted, so that the ascending vapours pass easily away, and the frames do not require to be placed in a separate stove. This method of drying thus comes as nearly as possible to open-air drying. Good work may often be done in a dry house especially constructed for the purpose. The bars may be arranged just as for open-air work, then the steam pipes may pass, one just above the lower bar, and another just below the upper bar, while the cloth is stretched on either side of the frame. In this way, the heat is kept inside the cloth, and all the benefit possible is derived from the expenditure of the least amount of steam. Drum, or cylinder, dryers are often seriously objected to on more grounds than one. It is said that when the radiators, or pipe coils, are enclosed in the drum, the flocks from the cloth fill them up, and prevent or impair the proper escape of the steam and heat. But if everything is kept as clean as it should be, and if there is plenty of steam, there need be no trouble from this point. Another objection is that the goods are often uneven in width and irregular in length. The only way of obviating this difficulty is to exercise more care in running the fabric on the cylinder, and to keep, as much as possible, both selvages evenly and regularly apart. Goods must be dried as quickly as possible, and not allowed to stand so long that the drying process becomes a baking process. This is a grand mistake. First, see that the goods are perfectly clean, and that will go a long way toward improving the appearance and finish of the fabric, and also toward doing away with all differences in the results which are attained by the adoption of different methods and plans in this particular process.—*Boston Journal of Commerce.*

Australia as a Cotton and Silk Country.

Much has been said from time to time, in the leading daily and trade papers, as to the benefits that would accrue, both to the mother country and to our Colonies, if greater interest was taken by capitalists of this country in endeavouring to put our dependencies on a better footing as regards enabling them to send home larger quantities of their produce of various kinds, and, at the same time, giving them a helping hand in fostering new industries in their midst. The question of what Australia could do in the way of producing cotton and silk, in such quantities and at such a cost, that they could be brought to Britain at paying prices, has often been ventilated in the papers, but, hitherto, the result has been nil. Many reasons have been given why so little has been done in this direction, a few of which have recently been exploded. One, that the climate of Australia is unsuitable for cotton growing and silkworm rearing, has been proved to be incorrect, for, in certain districts, experiments have, during recent years, been made with satisfactory results as regards quality of cotton, length of staple, and the cost of growing, and, therefore, now is the time for those capitalists who take an interest in the textile industries to do what they can in the direction of bringing the cultivation of cotton and the rearing of silk in our Australian colonies well to the front, and putting them upon a substantial footing, so that they can compete successfully with other countries in furnishing us with these two commodities. A contemporary, referring to this question and to a sample of cotton sent to them that had been grown in the Clarence River district, New South Wales, says:—"The cultivation of the cotton plant, in regions where it can be made fruitful, is now generally recognized as of the utmost importance, considering the relative position of supply and demand for the raw material. The United States, notwithstanding the yearly increase in

acreage, is, and has been for a number of years, behind in supplying the increasing wants of manufacturing, and the deficit has not been met by any adequate expansion of cotton cultivation in other countries. For this reason, the recent receipt of a boll of cotton grown in Australia was viewed by us with considerable interest as, possibly, prognosticating a new and important field for the growth of cotton. The single specimen that has been sent to us is the result of an experimental trial, in a latitude south of the equator, corresponding to that of the United States, where the growth of cotton has been attended by the utmost success. The sender of the specimen writes us that the cotton was raised on light, sandy soil, where no artificial fertilization had been resorted to. No estimate could be made of the probable yield per acre. But little can be said of value concerning the adaptation of the soil and climate of the Clarence district to the cultivation of this staple. Thus far, everything has been purely tentative, and no inducements have been offered to farmers to carry the industry beyond this stage, and they do not feel inclined to move first, but prefer to await the motion of the Government or manufacturers. Efforts are now being made to bring the matter more fully to the serious consideration of English spinners, but, thus far, very little apparent interest has been taken in the subject." Undoubtedly, if the matter was thoroughly taken up in this country, cotton growing in the district named could be made to pay well, provided the facilities for transport were rendered somewhat easier as far as the cost of carriage to this country is concerned, for, in conversation with those who have been in the district and who have turned their attention earnestly to the matter and have made experiments, the only question now is one of capital to enable farmers and others to carry out the work of growing, as they are very sanguine that, if sufficient interest were taken in the industry by English spinners and importers, the project could be made a great success. As regards silk-rearing, specimens of good marketable silk have been sent to this country, and the question now is, as in the case of cotton growing, one of capital and cheap means of transport, as those who have been engaged in experiments are sure that this industry could also be made of great benefit to the mother country and to the Australian colonies alike.

Tariff Changes and Customs Regulations.

NOTE.—Poud = 36 lbs. avoirdupois. Gold Rouble = 3s. 2d.

RUSSIA.—The *Journal de St. Pétersbourg* says that an increase of import duties has been established, by the Russian Government, on cotton yarns of superior quality and sewing threads, in the following proportions:—Cotton yarn—(1). Numbers below No 40 (English enumeration):—(*a*) Natural colour, 3 r. 60 c. metallic per poud. (*b*) Bleached and dyed (with the exception of yarn dyed Turkey red), 4 r. 70 c. metallic per poud. (*c*) Dyed Turkey red, 5 r. metallic per poud. (2). From No. 40 to No. 50 (English enumeration):—(*a*) Natural colour, 5 r. metallic per poud. (*b*) Bleached and dyed, 6 r. metallic per poud. (3). Numbers ranging from 50 upwards (English enumeration):—(*a*) Natural colour, 7 r. 50 c. metallic per poud. (*b*) Bleached and dyed, 8 r. 50 c. metallic per poud. Sewing cotton on wooden bobbins, 8 r. metallic per poud, gross. Twist yarn, with the exception of yarn on bobbins, 10 r. metallic per poud, gross. Thread made of silk and cotton to be cleared under section 213 of tariff, in accordance with observation to section 188, which is to the effect that rope, twine, &c., with admixture of silk, wool, silk waste, or cotton, pay duty as galoons, braid, &c., according to material of which made. Duty 45 copecks gold per pound Russian.

UNITED STATES.—Mohair tops, made from the hair of the Angora goat, the same being scoured Angora hair, costing under 30 cents per pound in the unwashed condition, and being in the form of tops in their ordinary condition, are dutiable at the rate of 60 cents a pound. Tickets to be attached to cotton embroideries are dutiable as printed matter.

NOTE.—Kilog. = 10 Hectogrammes = 2·204 lbs. avoirdupois.
Litre = ·22 Imp. gallon.

PHILLIPINE ISLANDS:—

		Pcs. Cts.
Hemp, flax, or jute, raw	100 kilos.	11·00
Yarn, twisted, of hemp, flax, or jute, of two or more threads	Kilo.	0·15
Yarn, of cotton of all kinds, and raw cotton for weaving	,,	0·10
Yarn, of silk or silk waste, twisted or not, of one or more threads	,,	1·50
Yarn, of wool, combed or carded	,,	0·35
Small wares of silk or of silk mixed with other textile materials, the latter not to exceed 50 % of the weight	,,	1·40
Small wares of wool or of wool mixed with other textile materials, the latter not to exceed 50 % of the weight	,,	0·70
Small wares of any other kind	,,	0·40
Sacks	Hundred	0.40
Sacks of cloth will pay according to the quality of the tissues.		
Sacks of abaca, hemp, flax, or jute, up to ten threads counted in a square of six millimetres will be admitted at 85 cents. per kilo., according to the Royal Order of 19th March, 1880.		
Hats and caps of all kinds, finished or not	Each	0·16

COTTON TISSUES.—*(See notes D, E, and F).*

Tissues, plain, twilled, loom-worked, unbleached, dyed or printed, having up to 25 threads inclusive in warp and woof in a square of six millimetres	,,	0·10
Tissues, plain, twilled, loom-worked, unbleached, dyed or printed, having 26 to 35 threads inclusive	,,	0·16
Tissues, plain, twilled, loom-worked, unbleached, dyed or printed, 36 threads and more	,,	0·22
Tissues, open up to 30 threads	,,	0·22
Tissues, open, 31 threads and more	,,	0.34
Tissues, embroidered and quilted	,,	0·25
Tissues, cotton velvet, plushes	,,	0·26
Tissues, tulle lace and crochet stitch	,,	0·70
Millinery and wearing apparel	,,	0·25

TISSUES OF ABACA, HEMP, FLAX, OR JUTE.

Plain up to 17 threads inclusive	,,	0·10
Plain from 18 to 36 threads	,,	0·22
Plain, 37 threads and above	,,	0·56
Plain, twilled, figured, or damasked	,,	0·20
Lace, gimp lace and crochet stitch	,,	2·40
Millinery	,,	0 60

TISSUES OF WOOL AND HAIR.—*(See notes D, E, and F).*

Plain, twilled, or figured, such as alpaca, merinos, muslins, damasks, and reps	,,	0·50
Coverings of hair, long or short, such as flannels, blankets, &c.	,,	0·20
Cloths, soft wools, cashmeres, and other drapery	,,	0·40
Millinery	,,	0·24
Millinery, of hair	,,	0·40

SILK TISSUES.—*(See notes D, E, and F).*

Tissues of silk, floss silk, waste silk, and raw silk, plain, twilled, and figured, including velvets and plushes	,,	2·40

NOTE D.—Tissues with admixture will pay duty as follows:—(1). Tissues of linen, wool, and silk, which contain only a mixture of cotton in a portion of the warp or woof, will be considered, for the payment of the duties, as being of linen, wool, or silk, without admixture. (2). Tissues of wool and silk, or waste silk, of which the warp or woof is one of these materials, will pay one-fifth of the weight as silk and four-fifths as wool. (3). Tissues of linen and silk, of which the warp or woof is one of these materials, and those of cotton and silk, having the warp or woof entirely of cotton, will pay four-fifths of the weight, as tissues of linen or cotton, according as the case may be, and a fifth as silk. Plushes and velvets, which pay three-fifths as cotton and two-fifths as silk, are excepted. (4). Tissues of linen and wool, having warp or woof of one of these two materials, will pay three-fifths of the weight as woollens, and two fifths as linen tissue. (5). Tissues of linen and cotton, having the warp or woof entirely of cotton, will pay half of the weight as tissue of cotton, and the other half as linen tissue. (6). Tissues of wool and cotton, having the warp or woof of one of these two materials, pay three-fifths of their weight as woollen tissue, and two fifths as cotton. (7). Tissues which contain a mixture of two or more materials in the two parts of the tissue will pay three-fifths of their weight for predominating material, and two-fifths for that which is subject to the lowest duties. (8). Tissues which, having all the warp or woof of linen, wool, silk, or cotton, contain, in the other part of the cloth, (woof or warp as the case may be) two or more of these materials will pay, according to the preceding rules, as composed of linen, wool, silk, or cotton, and of the material which, in the other part of the tissue, pays a lesser duty. (9). Hosiery, lace, and tulles, with admixture, pay according to the material of which chiefly composed.

NOTE E.—Ready-made articles of clothing, except millinery, will pay, for the total of their weight, a duty fixed for the stuff of which they are composed on the exposed side, with an addition of 50 % of the same duty. Are considered as ready-made articles of clothing, not only those completely finished, but also those half sewn or simply tacked.

NOTE F.—Stuffs, hand or machine embroidered, and those which contain a mixture of fine or imitation metals, will pay the duty corresponding to the quality of the tissue to which they belong, together with an addition of 50 % of the same duty.

According to *Kemp's Mercantile Gazette*, the number of failures in England and Wales gazetted during the four weeks ending Saturday, July 26th, was 302. The number in the corresponding four weeks of last year was 388, showing a decrease of 86, being a net decrease in 1890, to date, of 333. In addition to these gazetted failures, there were 245 Deeds of Arrangement filed at the Bills of Sale Office during the same four weeks. The number filed in the corresponding four weeks of last year was 258, showing a decrease of 13, being a net decrease in 1890, to date, of 43. The number of Bills of Sale published in England and Wales for the four weeks ending Saturday, July 26th, was 655. The number in the corresponding four weeks of last year was 716, showing a decrease of 61, being a net decrease in 1890, to date, of 698. The number published in Ireland for the same four weeks was 32. The number in the corresponding four weeks of last year was 34, showing a decrease of 2, being a net decrease in 1890, to date, of 76.

ORIGINAL DESIGNS.

Our first plate contains a design for a Lace Curtain, drawn by Mr. R. T. Lord.

* * * * *

On our second is a pattern for a Mantle Cloth.

* * * * *

The third is occupied by a Lace Curtain, designed by Mr. C. W. Sandiforth, 103, Racecommon Road, Barnsley.

MONTHLY TRADE REPORTS.

WOOL.—There has been but little animation in the wool trade. As a rule, there has been an absence of speculation, and sales have mostly been for current needs. English wools, especially in the country, keep firm prices. There is little new to note as regards the yarn branches. Machinery may be a little better employed, but new orders have come in very slowly. Mohair and alpaca yarns have met with rather more favour recently. The piece branches have improved slightly, with the exception of plain worsted coatings, in which there have been no signs of amendment. Serges are meeting with increased favour, especially those of a heavy make.

COTTON.—The markets for the raw material have shown a decided firmness in tone as regards rates, with a fair demand. The yarn branches have only had a moderate call, as the prices generally offered have been such as, in face of the firmness of the raw material, have placed spinners in an uncomfortable position, therefore, unless absolutely in want of employment for their spindles, they have been compelled to refuse new business. Some spinners, who have stocks of cotton on hand, have accepted ruling rates, so as to secure orders. The demand for cloths has varied, as manufacturers generally have held steadily for top prices, and as, in many cases, they have contracts on hand, new business has not been eagerly sought, nor new orders booked, unless at firm rates.

WOOLLEN.—This branch of trade, with some slight exceptions, keeps in a very healthy state. The firmness of prices at the close of the last London sales has had a beneficial effect, and merchants who had been holding back orders seem, recently, to have been very eager to place them at old rates wherever possible. The demand for worsteds, of fine and medium qualities, keeps good, but the lower classes are much neglected. Serges are still in decided favour in all qualities, both in plain and fancy patterns. Woollens have met with large orders for next season, and those specially adapted for the ready-made clothing trades have sold freely. Mantle cloths of a fancy character have also been in great request, and makers of these are extremely busy and are likely to be so for some time to come. Prices generally are very firm, and the tendency is upwards.

LINEN.—A welcome improvement may be noted in most branches of the linen trade and, although contracts are being booked at low rates, more looms are being put to work than for some time past. In fine damasks, there is nothing new to note. In drills, more inquiries and orders have been the rule, and the same may be said as regards sheetings and bed linens generally. Domestic cloths have sold up to an average, these being principally for the home markets. Hand made linens have sold slowly, looms making these goods being only partially employed.

LACE.—With the exception of the curtain branch of the lace trade, business has been very languid, and the orders booked and the sales made have invariably been at very low rates, prices generally being most unacceptable to sellers. The sales of silk tulles and stiff nets have fallen off, and the same may be said of millinery laces. Trade with South America, which had recently been on the increase, has been stopped by the recent reports of revolution in the Argentine Republic, this having caused an uneasy feeling as regards other States. There has been an improvement in the demand for hosiery goods.

New Patented Fabrics.

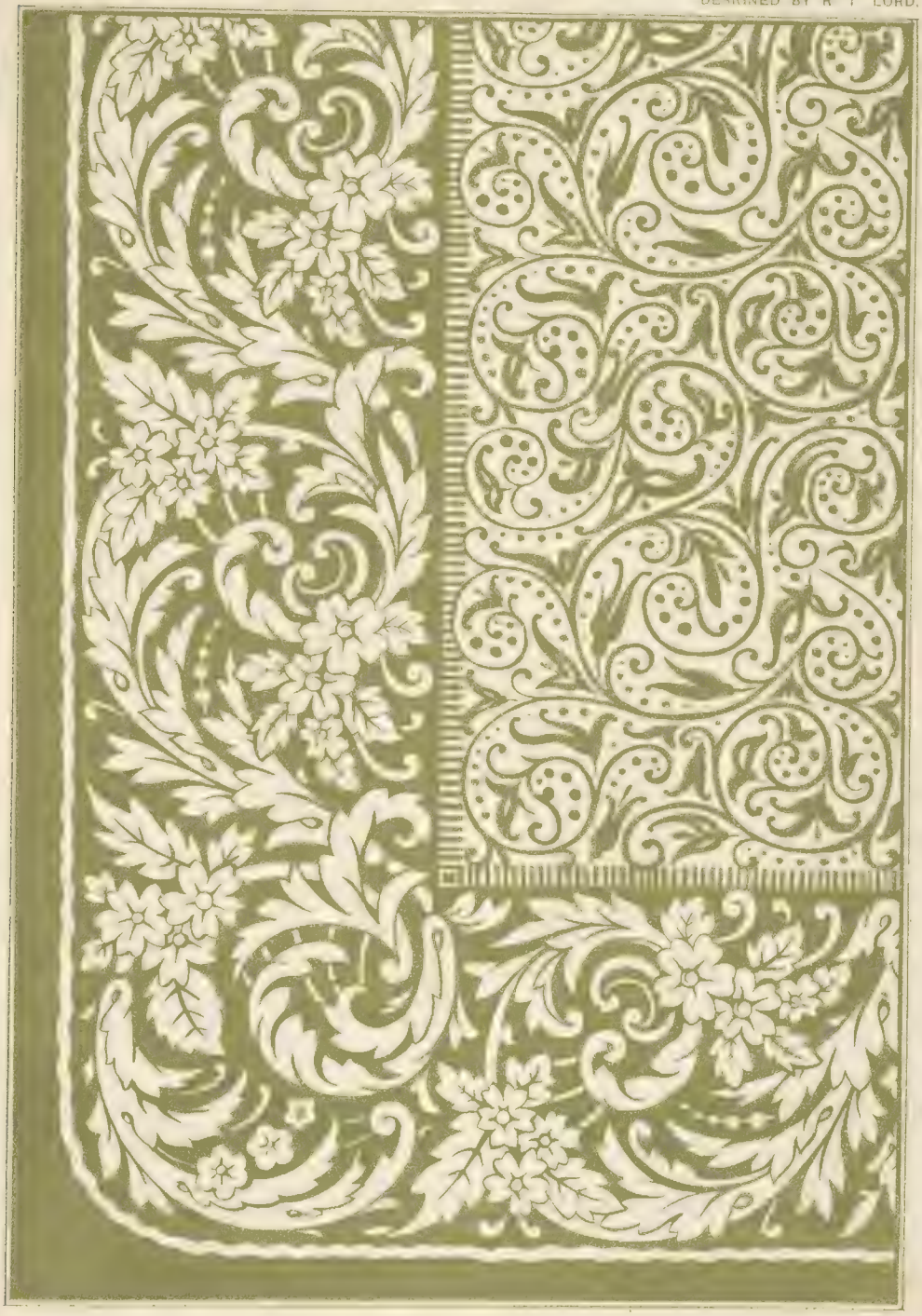
BLEACHING FIBROUS MATERIAL BY AID OF ELECTRICITY.

An invention referring to those bleaching processes in which the bleaching agents are prepared electrolytically has for its objects not only to economise power in the production of the electric current required for the electrolysis, but also to economise chemicals. In those cases where electrolytic processes have been employed in bleaching fibrous materials in the manufactured or in the raw state, it has been usual, hitherto, to prepare the bleaching agents in a separate vessel, by the decomposing action of an electric current, and, afterwards, to use them in the same manner as bleaching agents prepared in another way, viz.:—in the form of baths, in the bleaching kier, &c. According to this invention, the decomposition of the materials which are to furnish the bleaching agent is effected in contact with the fibrous material to be bleached, so as to allow the products of the decomposition to act in the nascent state, whereby the effect is considerably enhanced, and, consequently, the quantity of products required for obtaining the required result, or the amount of mechanical power necessary for the electrolytic decomposition, is reduced in a proportional measure. To this end, the fibrous material to be bleached is first impregnated with the solution from which the bleaching agent is to be obtained by electrolysis, and, afterwards, the fibrous material is, in the form of a layer of suitably chosen thickness, carried through between the two electrodes. In consequence of the small distance between the electrodes, but little resistance is opposed to the passage of the electric current, so that a current of low electro motive force will suffice. The positive electrode or anode is made of a material which is not attacked by the evolved bleaching agent, which may be, for instance, chlorine evolved from a solution of a metallic chloride, in which case the said electrode should consist of carbon or platinum. The best shape given to the electrodes is that of revolving cylinders or rollers, which carry along the layer of material and, simultaneously, convey the electric current through the same. An advantageous arrangement consists in a succession of several pairs of cylinders or rollers in which the anode is alternately situated above and below, so as to cause the bleaching agent set free by electrolysis to come into contact with the upper and the lower layer of the material alternately. In certain cases, it is found advantageous to pass between the electrodes, together with the material to be bleached, a layer of felt or, simultaneously, to move along two layers of material, either of which is then impregnated with the anion, while the other is impregnated with the cation. In order to prevent the escape of those quantities of chlorine which are not absorbed by the bleaching processes, substances capable of absorbing chlorine are added to the electrolyte; such substances are, by preference, alkalies, such as soda, ammonia, lime, magnesia.

REMOVING GREASE FROM, AND BLEACHING, TEXTILE MATERIALS.

A new product, which is the subject of an application for a patent, is principally constituted of a mixture of caustic soda, and hydro sulphide of soda, (Na H S) in equal proportions. The caustic soda is replaced by a caustic salt, such as commercial carbonate of soda, containing a certain proportion of caustic soda, and the hydro sulphide of soda by monosulphide of sodium, prepared by dry means. These substances, of which the proportions can be varied to a considerable extent, are dissolved either separately or together; they are, if necessary, clarified, by decantering or by filtration. The liquid thus obtained can be employed, either pure, or mixed, according to the applications to which it may be put. When it is desired to obtain the product in a solid state, for the purpose of commerce, 100 parts in weight of the alkaline liquor before mentioned are, as a rule, used, but containing by preference 70 parts, or thereabouts, of soda or caustic salt, and 30 parts, or thereabouts, of hydro sulphide of soda or of monosulphide of sodium. This alkaline sulphuretted product is crystallized, by mixing it cold with an equal weight of carbonate of soda at about 90°. The crystallization takes place after a few hours. The proportion of carbonate of soda may reach, sometimes, 140 % of the weight of the liquor, if it is desired to obtain harder crystals and a more rapid crystallization. The product can be used with advantage for the removal of grease, and for the washing and lixiviating of any description of textile materials. For all operations, it is sufficient in principle to prepare a bath containing a convenient proportion of the product, according to the effects to be obtained. This bath is employed hot or cold, as the case may be, and, if it is desired to obtain more bleaching, a small quantity of sulphurous acid is added in the liquid, as a decolourizer, during, or after, each operation. Or equivalently, the objects may be passed into another bath containing ordinary water acidulated with sulphurous acid. The following are instances of the process which it may be necessary to follow for the application of the product in the various operations. Washing and lixiviating linen.—In 100 kilogrammes of pure water is dissolved 1·500 kilogrammes of the composition of sulphuretted alkali. The linen is immersed by folds into this mixture in proportion to the size of the bucking tub, it is then allowed to macerate two or three hours cold. It is afterwards heated to a sufficient temperature for about two hours, and then allowed to settle, and is afterwards washed and rinsed in water in the usual manner. According to the degree of whiteness that it is desired to obtain, a variable proportion of sulphurous acid is added, either in the bucking tub, or in a special bath, in which the linen is soaked before rinsing. Treatment of the ramie.—The fibres are first soaked cold in a bath composed of 100 kilogrammes of ordinary water and two to three kilogrammes of the sulphuretted alkaline composition, the quantity being augmented or diminished according to requirement, it is then made to undergo boiling, during which the fibres of the ramie are put into motion by any mechanical means, and afterwards the various rinsings are proceeded with in ordinary water. For the other textile materials, the operation differs little, as, in each of these operations, the alkaline solution is more or less sulphuretted according to requirement. It is the same for the removal of grease from wools and the fulling of woollen yarn and woollen cloth—a quantity of 1·500 kilogrammes to 2·500 kilogrammes of the sulphuretted alkaline composition to 100 litres of water is sufficient to effect a perfect removal of the grease. A quantity of about 2·500 kilogrammes of sulphuretted alkali, dissolved in 100 litres of water, is employed in these operations of fulling and removing of grease from cloths, woollen yarn, and woollen cloth. This new product does not dispense with the employment of olein in mixture therewith, in the different operations of fulling and removing of grease from wools and woollen cloth. The cloths retain all their softness, the removal of the grease is complete, and the colours are brightened to a very sensible degree. The application of the product is, moreover, economical, as it accelerates the fulling, and only requires 50 % in comparison with the products in use at present. The patentee does not limit himself solely to the proportions indicated, as the proportion of the composition may be varied according to the effect to be produced. Thus, as the case may be, the proportion of sulphuretted alkali to be employed may vary from 1 to 50 % in weight.

DESIGNED BY R. T. LORD.



LACE CURTAIN.

MANTLE CLOTH.

DESIGNED BY C. W. SANDIFORTH.

LACE CURTAIN.

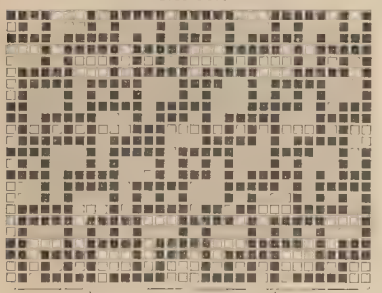
FASHIONABLE DESIGNS.

* * * * * A Supplement, containing Woven Specimens of the Designs given on this page, is presented each month to those of our Subscribers who manufacture Cloth for Ladies' and Gentlemen's wear.

Ours was the first Journal in this country to give woven samples of various descriptions of fabrics regularly each month, and since we commenced this feature, some years ago, it has, to some extent, been adopted by others. In matters connected with every branch of designing, we stand ahead of all other Journals.

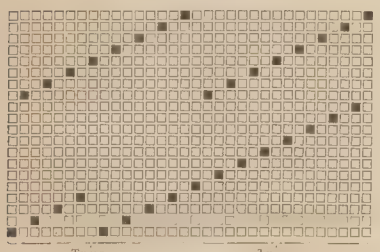
Worsted Suiting.

No. 647.



Twice. Twice.

Design.



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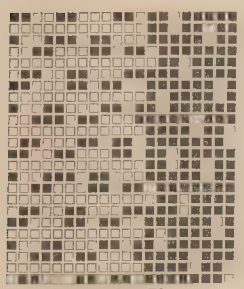
Draft.



Pegging Plan.

6650 ends in warp: 104 ends per inch; 13's reed, 8 ends in a reed; 76 picks per inch; 64 inches wide in loom; 56 inches wide when finished.

Weight 21⅛ ozs.

Warp :—		Weft :	
4 ends Twist, 2/40's.		1 pick Twist, 2/40's.	
40 ,, Blue, ,,		1 ,, Black, 10 skeins.	
4 ,, Twist, ,,		1 ,, Twist, 2/40's.	
48 ,, Blue ,,		1 ,, Black, 2/48's	15 times.
		1 ,, Black, 10 skeins	
		1 ,, Black, 2/48's	

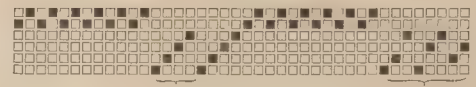
96 ends in pattern. 48 picks in pattern.

Worsted Trousering.

No. 648.

5 times. 3 times.

Design.



3 times. 3 times.

Draft.

Pegging Plan.

5000, ends in warp; 80 ends per inch; 10's reed, 8 ends in a reed; 34 picks per inch; 62 inches wide in loom; 56 inches wide when finished. Weight 22½ ozs.

Warp :—12 ends Black, 2/40's worsted.	
24 ,, Blue, ,,	
12 ,, Black ,,	
4 ,, Blue, ,,	
1 end Twist, ,,	5 times.
2 ends Blue, ,,	
1 end Twist, ,,	
4 ends Blue, ,,	

72 ends in pattern.

Weft, 8 skeins.

Woollen Suiting.

No. 649.

Design.

Warp :—		Weft :—	
5 ends Black, 20 skeins		2 picks Twist, 12 skeins.	
1 end Slate, ,,		4 ,, Black, 18 skeins	Twice.
1 ,, Black, ,,		4 ,, Slate, ,,	
1 ,, Slate, ,,		2 ,, Black, ,,	7
5 ends Black, ,,		2 ,, Slate, ,,	times.
1 end Twist, 12 skeins.		2 ,, Black, ,,	
3 ends Black, 20 skeins.			
1 end Slate ,,	7	48 picks per inch.	
3 ends Black ,,	times.		
1 end Slate, ,,			
1 ,, Black, ,,			
1 ,, Slate, ,,			

48 ends in pattern.

4,032 ends in warp: 64 ends per inch; 8's reed, 8 ends in a reed; 60 picks per inch; 63 inches wide in loom; 56 inches wide when finished. Weight 25 ozs.

Mantle Cloth.

No. 650.

Design.

1,340 ends in warp; 21 ends per inch; 7's reed, 3 ends in a reed; 22 picks per inch; 64 inches wide in loom; 56 inches wide when finished. Weight 11½ ozs.

Warp and weft 14 skeins.

A commercial museum has been established in Warsaw, which is to form a permanent exhibition of specimens of the products and manufactures of Poland, as well as a bureau of information for Russian or foreign merchants. At a small charge, all persons can be supplied, at the office of this museum, with information on any subject connected with trade. The museum is at present at No. 66, Faubourg de Cracovie, Warsaw. A museum of a similar character is to be established at Alençon, by the Chamber of Commerce of that town.

MACHINERY, &c.

Turner's Patent Oil Filter.

Many kinds of apparatus have been put before users of oils, during the past few years, for the purpose of filtering such as have been used for lubrication, &c., and have become charged with extraneous matter. The means taken for bringing this spent oil back to something like its original state, so that it can be again utilized, have been various, and more or less of an effective character. Descriptions of filtering apparatus have recently appeared in our columns, as this question is one of moment to users of oil generally, because, at a slight expenditure, mechanisms calculated to reduce oil bills can now be had which, owing to recent improvements, are guaranteed to effect this object. The Turner Oil Filter Co., Church Street, Preston, have an apparatus, the leading features of which can be seen in the annexed engraving. Fig. 1 is a sectional elevation, and Fig. 2 an end view of the filter, which consists of a cylindrical vessel. In Fig. 1, A.A.A. are filtering cylinders which are filled with clean cotton waste. B.B. are vertical cylinders to contain clean water. C. is an iron steam box which is filled with water. D. is a perforated cylinder,

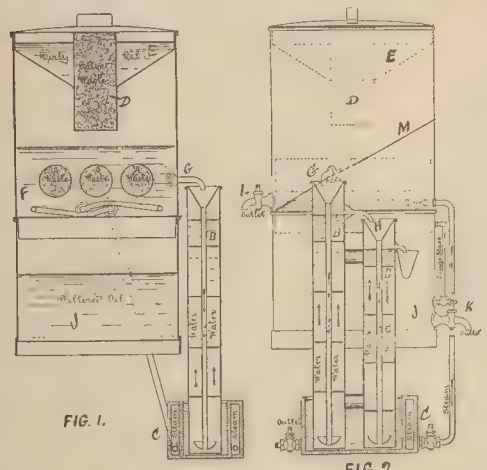


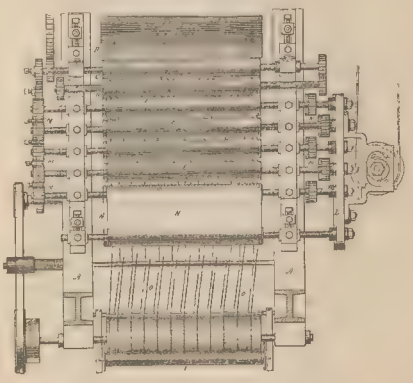
FIG. 1. FIG. 2.

Turner's Patent Oil Filter.

also filled with clean cotton waste. The action of the filter is as follows:—Dirty oil is put into the conical tray, E., steam is then applied until the oil is liquid enough to find its way through the cotton waste, in cylinder, D., into the chamber, F., it then works its way through the horizontal cylinders, A.A.A., to the outlet, G., whence it flows into the taller cylinder, B., down the internal pipe, to the bottom; it then rises to the top, through the water contained in the cylinder, to the outlet, H., and flows in a similar manner through the second cylinder, B., and drops into the chamber, J. This operation goes on as long as there is any oil in the receptacle, E. The clean oil can be drawn out of the chamber, J., as required by tap, K. The outlet tap, L., is for the purpose of allowing any accumulation of dirt, &c., to be removed, the sloping bottom, M., carrying any extraneous matter towards this outlet. The apparatus carries on its work very effectively, and requires but little attention—an occasional cleaning out of the waste being sufficient—which operation can be done in a few minutes. The Turner Co. guarantee that spent and dirty oil, after passing once through the filter, is equal to the new article for lubricating purposes, and that the oil will come out free from impure matter and water. The filter is made in several sizes to suit varied requirements, particulars of which can be had on application.

Machine for Condensing Slivers of Cotton, Woollen, and other Fibres.

This invention refers to machinery employed in condensing or rubbing slivers of fibre between reciprocatory "rubbers." In constructing a machine for the above purpose, a series of pairs of rollers are arranged side by side, the speed of each succeeding pair of rollers being quicker than that of the preceding pair, so that the slivers of fibre removed from the doffing cylinder and passing between such said rollers are drawn or draughted. In addition to the series of pairs of rollers having a rotary motion, they have also imparted to them an endwise or reciprocatory motion, so that, in addition to the fibre being drawn, it is also rolled or rubbed into a slubbing or thread. In combination with these revolving reciprocatory rollers, one or more pairs of rubbing belts are employed, between which the slubbing passes after emerging from between the last pair of rollers, and, finally, the slubbings are received by a condenser bobbin or drum upon which they are wound. Fig. 1 is a plan view of the improved machinery. A. represents the framework of the machine, and B. a portion of the carding cylinder or doffer from which the fibre is stripped by the toothed rollers, C. and D. Letter E. represents a series of revolving rollers, the rotary motion of each pair increasing on the preceding pair, such varying speeds being obtained by the arrangement of toothed wheels, F., which contain fewer teeth necessary for the increased speeds, so that the sliver passing between these rollers is drawn or draughted, as will be well understood. In addition to these rollers having rotary motion, and gaining in speed one on another, as described, we impart to them an endwise or reciprocatory motion for the purpose of rolling or rubbing the sliver into a thread, the endwise motion of such rollers being obtained by means of eccentrics, G. and H., working within yokes, I. and J., attached to the side brackets, L., by which the axles



Machine for Condensing Slivers of Cotton, Woollen, and other Fibres.

of the rollers are carried, the usual form of broad-toothed wheels, M., being employed to allow for the endwise motion of the rollers. After the sliver has been drawn and rolled by the drawing rollers, E., it is received by one or more pairs of endless rubbers, N., which also have rotary and endwise motion for the purpose of more effectually rolling and rubbing the sliver into a more perfect thread or slubbing, O., after which the said threads are wound upon the condenser bobbins, P., to receive the subsequent processes of manufacture. Instead of the rubbing belts, N., operating upon the sliver after the rollers, E., such said rubbers may operate upon the sliver before the rollers, E. By employing pairs of rollers gaining in speed one upon the other, a draught is given to the fibre, and, when used in combination with reciprocatory rubbers, a finer slubbing or thread is produced thereby than can be effected by the condensing machinery at present in use.

Improved Mechanism for Making Looped or Pile Fabrics.

An improved apparatus to be employed in the manufacture of travelling rugs, fancy mats, and other looped or pile fabrics, consists of a combination of mechanism, whereby the "loops" are formed on a ground piece or "backing" of canvas, and such loops, may, when desirable, be cut by any of the well-known devices—thus forming "pile" fabrics. It consists of a frame and rollers for carrying and stretching the canvas ground-piece or "backing," while the needles insert the yarn into the latter for forming the "loop" or "pile," as may be desired; of an improved construction of needle for inserting the pile yarn, together with appliances for operating the needles. According to this invention, a frame is constructed consisting of two vertical side pieces to the lower end, and at the back of which is a beam for carrying the canvas backing which, passing therefrom, is taken over or under a tension roller on which are small pins, similar to loom temples, for the purpose of stretching the canvas backing laterally. This tension roller is provided with a drag cord and weight for varying the drag on the same—the backing passes from the latter roller to the front of the frame and over two guide pieces, formed of strips or bars of wood, or of metal fixed across the front of the frame, from side frame to side frame. At this point, the yarn to form the "loop" or "pile" is inserted as described below, and the canvas is carried over a second roller, on which are pins, or temples, and then, in its finished state, over a guide delivery roller or rollers, to any convenient receptacle or part of the frame. The second roller, with pins or temples, is driven by worm and worm-wheel, pulley and belt, and acts as taking-up roller, and has imparted to it an intermittent motion, by means of a slide hereinafter referred to, operating rack and pinion—the rotation of the pinion being utilized to transmit motion by pulley and cord, or otherwise, to the worm shaft of the taking-up roller, and the backing is thus stretched by and between the two rollers. At the front of the frame, and opposite the two strips or bars of wood or metal above-mentioned, is a

rod or shaft parallel to the strips or bars, and on this rod are mounted a series of hooked or sickle-shaped needles, and from the boss of each needle extends a short finger, the end of which is received in a cam slot formed in a slide piece, which slide piece is traversed, from one end of the frame to the other, by means of a coarse pitched screw or worm, operated by hand wheel or driven by pulley and belt, which screw or worm is reversed or turned in the opposite direction, when the cam and slide have reached one end of the frame, by which the slide and cam are worked to and fro, or from side to side, and the cam or cams, operating on the finger of the sickle-shaped needles, depresses or raises (according as the hooks of the needles are bent upwards or downwards) the same, and passes the point of each needle, by a radial motion, through the backing or canvas, carrying with it the pile yarn. Each needle has, near its point, an "eye," through which the yarn to form the "pile" or "loop" is passed. The yarn being carried on bobbins or spools on the frame passes through a second eye, formed at the bend or elbow of the sickle-shaped needles, thence into a groove formed in the outer edge of the needle to the eye in the point of the same, so that, when the yarn is passed through the backing, it will form a loop, one part of the yarn being in the above-mentioned groove, and the other passing direct from the "eye" in the point of the needle to the backing. Between this thread of yarn and the needle, a rod of wire is inserted, and, when the needles are withdrawn, this rod regulates the size of the loop, or, if it is to form a "pile" fabric, there is at one end of the rod a knife, or cutter, which, when the rod is withdrawn by any of the well-known devices, will cut the loops, and thus form a pile fabric.

Brown on Loose Wool.

The practical dyer, says Dr. Reimann's *Faerber Zeitung*, knows that the formulæ for dyeing bronze and brown have recently been increased to an unlimited number, by the invention of the direct dyeing pigments, as well as by the alizarine dyestuffs. For the present, however, a few of the older methods of dyeing will be mentioned, or, in other words, those methods where camwood, caliatura, or young fustic and camwood are used. The colours obtained with the latter are excellent for fine yarns, because they are very fast against fulling, bleed almost nothing at all, and wear well. They are generally used for brown by previously mordanting. The colour not only becomes brighter by this process, but its power of resistance is equally increased. The following is an excellent, although a somewhat costly, recipe:—For 100 kilogrammes clean wool, mordant, boiling, with 2½ kilogrammes chromate of potash, 1½ kilogramme sulphate of copper, and 2 kilogrammes tartar. Dye with 60 kilogrammes cuba fustic, 50 kilogrammes camwood, and ½ to 1 kilogramme logwood. When the wool has been boiled for two hours, and handled well, pour upon it from 1 to 1½ kilogramme sulphate of iron, quite largely diluted, and boil for another hour. Cool the kettle well, and take out. Care is necessary that the wool, which is boiled with large quantities of ground dyewoods, should be boiled somewhat longer, but not too hard, and that all additions of cold water during the boiling must be avoided. When boiled sufficiently, cool off well. Brown colours dyed with ground dyewoods are apt to make the wool harsh, brittle, and inclined to felt. Rinse such colours carefully, dry the wool in medium hot chambers, and pass through the whipper. The palest and the darkest shades, as well as yellowish or reddish tones, may be dyed according to this method. The next method is much cheaper, and is as follows:—For 100 kilogrammes clean wool, mordant, boiling, with 2½ kilogrammes chromate of potash, 1½ kilogramme sulphuric acid, and dye with 45 kilogrammes fustic, 3 kilogrammes turmeric, 50 kilogrammes caliatura, and 1 kilogramme logwood. After boiling for two hours, sadden with 1½ kilogramme sulphate of iron, and continue boiling for another hour. Colours not as bright are obtained without mordanting. They are more suitable for cheaper grades of goods, or for backing. For 100 kilogrammes clean wool, boil with 30 kilogrammes fustic, 5 kilogrammes turmeric, 2½ to 5 kilogrammes logwood, 32½ kilogrammes sanderswood, and 5 kilogrammes sumac. Sadden with 6 kilogrammes sulphate of iron. After boiling for 1½ hour, pour over the wool two buckets of urine, and let it lie for several hours. Fairly bright colours are obtained with young fustic and camwood, and although they may not be quite as fast, they leave the wool soft and open. For 100 kilogrammes wool, mordant, boiling, with 2½ kilogrammes chromate of potash, 1½ kilogramme sulphate of copper, and 1½ kilogramme tartar. Dye with 70 kilogrammes young fustic, and 25 kilogrammes camwood; sadden with 2 kilogrammes sulphate of iron, and from ½ to 2½ kilogrammes logwood. A fast, but not very bright, brown is produced by mordanting, boiling, with chromate of potash and sulphuric acid, and dyeing with fustic, camwood, and logwood. Sadden with sulphate of iron. Wool to be dyed a cherry brown, which must not be boiled too sharply, and cooled well before taking out the wool, in order to preserve this in a condition to be spun, is not mordanted, but boiled for two hours in a bath (for 100 kilogrammes wool) with 75 kilogrammes caliatura, 2 kilogrammes logwood, 4 kilogrammes fustic, 1½ kilogramme tartar; and darkened with 1½ kilogramme sulphate of iron. A cherry brown, which resists fulling well, and which gives very good results in combination with white, is produced as follows:—Mordant 100 kilogrammes clean wool with 3 kilogrammes chromate of potash, and 2½ kilogrammes tartar, and leave the wool in it for one day. Boil 100 kilogrammes camwood, cool off with water, enter the wool, and boil gently for three hours. The solution of ¾ kilogramme sulphate of iron then carefully sprinkle over, continue to boil for another 1½ hour, cool off, and pour ¾ kilogramme crude hydrochloric acid, diluted in 60 litres [63¾ quarts] water, upon the wool, which is then left to lie for 30 minutes. Mulberry is produced in a manner similar to cherry brown:—100 kilogrammes clean wool are boiled with 15 kilogrammes logwood, 50 kilogrammes caliatura, and 1 kilogramme tartar. Sadden with 5 kilogrammes sulphate of iron. Red-brown colours are often dyed with camwood. It is well known, however, that these colours, although brighter, and leaving the wool softer and more open, are more fugitive than those produced in the manner indicated above. Cherry brown, also called Bordeaux, is dyed as follows:—For 100 kilogrammes clean wool, start the kettle with 12½ kilogrammes alum, mordant with 1½ kilogramme chromate of potash, and 3 kilogrammes tartar. Leave the wool immersed for one day, take out, rinse, and dye with 100 kilogrammes camwood, 12½ kilogrammes fustic, and 3 kilogrammes logwood. Boil the wool for one hour, and darken with 3 kilogrammes sulphate of copper. The wool is ready after boiling for 1½ hour. When dyeing to sample, the colour must always be kept two degrees lighter than is required, as it darkens considerably afterward.

Fast Grays on Wool with Alizarine Colours.

Alizarine, gallein, and ceruleine produce fast colours of this class which please the eye and are exceedingly serviceable. A red shade of alizarine paste (20 per cent.) used in the proportions of 1 to 4 per cent. of the weight of wool gives shades called wine-lees shades. By using a bluer alizarine, these shades may be given a bluer cast. They are dyed as follows:—*Mordant.*—For 100 lbs. of wool, make up a bath with a sufficient quantity of water containing:—Tartar, 2½ lbs. Bichromate of potash, 3 lbs. Mordant 1 to 2 hours at a boil.—*Dye-bath.*—The dye-bath is prepared in the following manner:—If the water contains lime, add acetic acid of 8° B. in the proportion of about 1 to 1,000. Add about one-half the colour necessary to obtain the shade desired, stir up the bath, enter the goods cold, and work 10 to 15 minutes without raising the temperature, and then add the rest of the colour. Finally, raise the bath slowly so as to reach 195° to 205° in 40 minutes. This temperature should be held for 2½ to 3 hours. The dyeing is considered finished, when a sample, which is dyed to the desired shade, does not bleed upon soaping. Wash in running water.—*Alizarine Orange.*—Alizarine orange W, in proportions from 1 to 3 per cent. of the weight of the wool, gives mahogony shades, which can be produced as follows:—Mordant by boiling for 1½ hour with the same mordanting bath as given above.—*Dyeing.*—Make up the bath as below:—Acetic acid, 1 part in 1000 of water. Orange, 1 to 3 per cent. Enter cold, and work the goods at near the boiling point for from 2½ to 3 hours.—*Ponceau Shades* can be produced with alizarine red by substituting alum for the chrome mordant. Mordant with the following proportions:—Wool, 100 lbs., tartar, 4 lbs., alum, 6 lbs.—*Scarlet Shades* can be obtained by adding to the tartar and alum about ½ pound of tin salt to 100 pounds of wool.—*Alizarine Blues.*—Bluish grays can be made with alizarine blue SW, in the proportion of 0.5 to 2 per cent. of the weight of the wool, and iron grays with the blue SRW, in the same proportions. Mordant for 100 pounds of wool with Tartar, 2½ lbs., bichromate of potash, 3 lbs., and boil for 1½ hour. Make up the dye-bath with water to which acetic acid has been added, using the proportion of blue given above. Enter cold, and dye just below a boil for 2 hours, and then wash carefully.—*Galleine*—Galleine W, used in the proportions of 2 to 6 per cent. of the weight of the wool, gives heliotrope shades. Dye with two baths exactly as given above for other alizarine colours.—*Ceruleine.*—Ceruleine SW gives moss-coloured shades with 0.5 to 1 per cent. of colour. Ceruleine is fixed by the method used for alizarine reds.—*Moniteur de la Teinture.*

Dyeing Receipt.

Aniline Bluish Black.—For 100 pounds of cotton:—Aniline salts, 10 to 18 lbs.; bicromate, 10 to 11 lbs.; muriatic acid, 3 to 8 lbs.; blue vitriol, 2 to 3 lbs. Work one hour in the cold, then raise slowly to a boil. Rinse, then give a logwood bath, adding, finally, a little copperas, or boil for two hours with a green soap.—*Industrie Textile.*

Indigo Vat for Wool.

Paul Cavailles uses the following indigo vat:—I. 10 kilogrammes [22 lbs.] pulverized indigo in 10 litres [10½ quarts] water of 140° F. are poured into 20 litres milk of lime, which contains from 6 to 7 kilogrammes [13 lbs. 3¾ ozs. to 15 lbs. 6¾ ozs.] caustic lime. II. 25 kilogrammes bisulphite of sodium of 30° B., are mixed with from 2 to 3 kilogrammes [4 lbs. 6½ ozs. to 6 lbs. 9¾ ozs.] zinc powder. The two solutions are mixed, forming a concentrated bath, and from which the dye bath is prepared by using as much as is necessary to obtain the desired shade. When the first lot has been dyed, more of the concentrated solution is added before the next lot is entered into the dye bath.

The Bleeding of Colours on Worsted Yarn.

The so called bleeding or smutting of colours on worsted yarn has, for a considerable time, been a problem which, although the solution of it has been attempted very often, still remains as much of an unanswered connundrum as it ever has been. Before the introduction of the alizarine colours in the dyehouse, when wood colours, fast against fulling but not against light, were generally used, the complaint was not so loud or heard so often. When yarn was dyed a chrome black, a distant muttering was occasionally audible, but since the alizarine dyes have been introduced and used in almost all dyehouses, the complaints have been louder and oftener. The bleeding of the colours is generally due to the incorrect treatment of the alizarine dyes. Dyers try to invent new methods of dyeing in place of leaving this part of the business to other and proper hands, and do not adhere to the methods specified by the dye factories. The troubles commence with the mordanting. Many think that they can cheapen this process by using, in place of tartar, oxalic acid, or, worse yet, sulphuric acid. This is altogether objectionable, because the best results are obtained with tartar. Another dyer tries to dispense with the rinsing of the mordanted yarn, the result being that the excess of chrome mixes with the dye bath, and, as a consequence, the dye will not fix so firmly, and a loss of dyestuff is brought about at the same time. Another reason for this bleeding is found in the shortening of the boiling process. The process of dyeing with alizarine should not be considered finished under two hours, because the colour is thoroughly fixed only after sufficient and long continued boiling. The addition of acetic acid to alizarine is very important, and contributes essentially to the good success of the colour. In the dyeing of yarn, the vats with indirect steam, which are also much employed in the larger yarn dyehouses, are of great advantage. The yarn should be treated at a temperature near the boiling point, say 200 degrees F., without being afraid that it will felt. In order to avoid the disagreeable occurrences occasioned by the long boiling, with subsequent additions, many practical men prefer to ascertain, by dyeing a hank or so, just what quantity of dyestuff is required for a lot and shade, and this method cannot be recommended too highly. Another great factor in the production of an alizarine colour, fast against fulling, is to have an absolutely clean yarn, free from grease. Both the mordant and the dyestuff can be thoroughly developed and fixed only upon entirely clean wool, and, besides this, more dyestuff is required for dirty than for clean yarn, and, in spite of the greater quantity of dyestuff used, the colour will come out uneven. This is also true of the wood colours. The bleeding and smutting of chrome black yarns is chiefly due to insufficient boiling, weak mordant, and yarn which has not been scoured enough, and the dyer will do well if he can superintend the different branches of the work himself, not depending on his assistants, when he desires to obtain satisfactory results. A good mordant for black on worsted yarn is the following:—3 per cent. of bichromate of potassium, 1½ per cent. of sulphate of copper, and from 2 to 3 per cent. of sulpuric acid. Boil for 1½ hour, and dye in fresh water, with the necessary quantity of logwood. It is advantageous to whiz the mordanted yarn before dyeing.

Various causes which produce the bleeding and running of the colours can be given. What is the reason, asks a correspondent in a German exchange, that red blanket stripes, the wool for which has been dyed with croceine scarlet, bleed in fulling, and turn yellow, when sulphured? Thirteen pounds of wool were dyed with 125 grammes [4⅖ oz.] of croceine scarlet and 170 grammes [6 ounces] of acetic acid, for one hour. The following answer is given:—One of the best results, when dyeing with azo-red dyestuffs, so far as fastness against fulling is concerned, is obtained as follows:— Mordant, for one hour and a half, with 12 per cent. alum and 2 per cent. tin salt. Dye by boiling for one hour with the necessary azo-red, without the addition of any kind of acid. Excellent results have always been obtained by using this formula, even if the red, when woven with white, had to be subjected to a strong fulling. It is not advisable to mordant and dye in one bath. The dyer must take particular pains not to let the fabric lie wet, particularly when charged with soap, when dyeing and fulling it. It must be whizzed and dried at once as soon as it is washed or fulled. Bleaching is best performed with peroxide of hydrogen (one part of this to four parts water), as this does not destroy, nor essentially alter, ponceau or fast-red colours.

Dyeing of Ramie.

Ramie is almost pure cellulose. This is the reason that its treatment by the dyer is, generally, almost the same as that of cotton. But as the ramie enters entirely into goods which are to be often washed, the colours must be fast to soap. The fibre must not lose, in any case, its brilliancy or strength. It is necessary, therefore, to shorten the dyeing as much as possible. A good aniline black can be produced upon it, but logwood is cheaper. The ramie is worked for an hour in a strong decoction and allowed to drain. A bath is then made containing 5 per cent. of blue vitriol, and 5 per cent. of copperas. The yarn is passed a number of times through this bath, drained, and allowed to oxidize in the air. Meanwhile, the logwood bath is diluted, brought to the boil, and ½ per cent. of bichromate of soda added, and the yarn passed through. It is necessary to use aniline colours to obtain light and brilliant shades upon ramie. Benzidine colours can only be used in certain cases. For basic colours, colourless tannin, freshly dissolved, is used. For light shades, 2 to 3 per cent. of tannin will answer, for dark shades, 7 to 8 per cent. must be used. Work the yarn in the tannin solution for one hour at 80° F., then fix in a solution of Haen's antimony salt, containing ⅝ ounces to the gallon for light shades, and 1 ounce to the gallon for dark shades. A previous passage through Turkey red oil makes the colours faster and more brilliant. A light blue is dyed with methylene blue and 5 per cent. of alum, after mordanting with tannin. Enter cold to avoid inequalities. A greenish blue is obtained with Nile blue. For red shades add methyl violet or methylene blue. A dark blue can be obtained with methylene blue, and a neutral blue dyed upon a tannin and iron mordant. For indigo, hydrosulphite and zinc vats are used. Greens are dyed with brilliant or malachite green upon yarn mordanted with tannin and an antimony salt. For yellowish shades use auramine, for bluish shades methylene blue. Olives are made with brilliant green and chrysoidine or Bismarck brown. Dark greens are obtained with brilliant or malachite green, or with new blue and malachite green, on yarn dyed with sumach and green vitriol. Dark olives are dyed like the dark green, except they are shaded with fuchsine or chrysoidine. Violets are obtained with the different shades of methyl violet, which permit the dyeing of shades from a light heliotrope to a dark prune. Rhodamine gives a magnificent pink upon ramie, if care is taken to avoid yellowing during mordanting. The pink is more beautiful if dyed simply with salt and rhodamine, but the lack of fastness is not compensated for by the brilliancy of the shade. Deep pink shades are obtained with fuchsine, ponceau, or mixtures of safranine and rhodamine. A mixture of safranine and rhodamine furnishes very beautiful bluish red. The yellow and orange shades are made with auramine and thioflavine for pure yellows, with chrysoidine and auramine for straw colour, and with safranine and auramine for orange. Old gold is dyed with auramine or thioflavine saddened, if necessary, with chrysoidine or Bismarck brown. For brown, cutch can hardly be recommended, since its high contents in tannin injures the brilliancy of the fibre. But it is difficult to replace it on account of its fastness. It is only useful in dark shades, and can only be used upon yarn which has not been oiled or bleached, if the brilliancy of the fibre is to be preserved. It is dyed just like cotton, and, after chroming, is shaded with fuchsine or auramine. It can be saddened with green vitriol before chroming. The benzidine colours are only useful on ramie for light shades, such as pink, cream, straw, ivory, heliotrope, etc. Pinks are obtained with benzopurpurine; orange, ivory, cream, etc., with toluylene orange. In dark shades, the benzidine colours give trouble, by staining the whites and neighbouring colours upon soaping. This can be avoided by passing the yarns, after dyeing, through a metallic solution, but this method is patented by a firm who will only allow its use by those who use their colours. Alizarine colours give very fast colours upon ramie, but they are not brilliant, with the exception of alizarine red, which produces a magnificently brilliant shade. It is dyed, as upon cotton, on an oil and alumina mordant. Alizarine blue S, ceruleine S, and alizarine black S, mixed with acetate of chrome and properly thickened, are fixed, after printing, by steaming. In the place of acetate of chrome, a mixture of chrome alum and bisulphite of soda can be used, after separating the sulphate of soda formed. Previous oiling must never be omitted if good results are to be obtained with alizarine colours. Gray shades are obtained in various ways; a light gray can be obtained with nigrisine on tannin, or with a mixture of toluylene orange and benzoazurine in an old bath. Various grays are obtained by mixtures of methylene blue with chrysoidine, malachite green with safranine, or methylene blue with safranine and auramine.—*Journal de Teinture.*

New Coal-Tar Colours.

The *Badische Anilin- und Sodafabrik* have brought out a new colour to be used as a substitute for archil. It is called *Azocarmin*, and takes very evenly. The colour comes upon the market in the form of a paste of golden scales. It is insoluble in cold water, soluble in hot water, with a red colour. In shade, it comes between fast red *D* and fuchsine *S*. It is dyed in a bath containing sulphuric acid, but the colour is not destroyed by an alkali, as is the case with acid fuchsine. The dyeing must be done in a wooden box, and the shade suffers from a tinned or copper vessel. *Carbazol Yellow and Cotton Yellow G.*—These colours furnish a beautiful, pure yellow, with more of a greenish tinge than that dyed with chrysamine. The properties of the yellows are similar to those of chrysamine. The following receipt is given for a heavy shade upon 100 lbs. of cotton:—Carbazol or cotton yellow G, 3 lbs., phosphate of soda, 10 lbs., Marseilles soap, 2½ lbs., common salt, 20 lbs. Dye at a boil for 1 hour, wash gently, and dry. Cotton yellow G is better adapted for printing purposes than carbazol yellow. The following receipt is given:—Dissolve 7½ parts of the colour in 400 parts of boiling water, and mix with 500 parts of 5 per cent. tragacanth paste, 50 of 20 per cent. white soap solution, and 50 parts of 20 per cent. sodium phosphate solution. After printing, dry and steam forty-five minutes without pressure.—*Die Chemische Industrie.*

—*Chrome Violet.*—This colour is specially designed for printing in connection with other chrome colours. It is fixed by chromium acetate, is a very soluble colour, and should be made as below:—Chrome violet, 10-40 parts according to shade, water, 100 parts, thickening, 300 parts, then add 20-100 parts of acetate of chome of 18° B. After printing, steam for one hour, wash, and soap.—*Chemiker-Zeitung.*

The Stamping of Hosiery.

The proposal to have hosiery manufactures stamped, so as to distinguish between machine and hand made goods, says a contemporary, is likely to receive a tolerably large amount of support. As stated at a public meeting, recently held, hand frame work knitters are of opinion that their trade has suffered considerably through the fraudulent misrepresentation of goods. It was pointed out by a gentleman from Nottinghamshire that the hand frame-work knitting industry has been on the down grade for the last twenty years. In some parts of England, it is alleged that workmen can only earn the miserable pittance of 8s. or 10s. a week. If, as is alleged, the too common practice of palming off steam made hosiery as hand made goods is at the root of these abnormally low wages, and the only remedy lies in improved legislation, then the sooner the law on the subject is altered and the marking of goods made compulsory on all manufacturers the better. We cannot see that makers have anything to gain by misrepresentation. That hand made hosiery is superior to machine made goods will not be doubted by anyone who has given the question a moment's consideration. The most reprehensible part of the hosiery business at present seems to be the manufacture of a certain class of goods partly made by hand and partly by steam power, and palming them off as being entirely hand made. The stamping of the goods would protect the interests of workers and honest traders from suffering through the inferior productions of unprincipled pretenders, and, therefore, we wish success to Mr. Broadhurst's Bill to amend the Merchandise Marks Act so as to compel the marking of hosiery in an efficient manner. In our opinion, the proposed legal distinction between the various qualities of goods should prove an invaluable protection to manufacturers who have a reputation to maintain, and the wonder, therefore, is that our local hosiery makers are not more deeply interested in the subject. As has been clearly shown by the discussions at the South of Scotland Chamber of Commerce, a trade mark for Scotch tweeds would serve to protect the industry and prevent spoliation by foreigners and unprincipled traders. The argument holds equally good in the case of our far famed Scotch hosiery, and manufacturers, instead of being dilatory, ought to be taking a leading part in the movement.

Personal and Trade Notes.

Messrs. Hutchinson, Hollingworth and Co., Limited, Loom Makers, Dobcross, near Oldham, have declared a dividend of 10 per cent. per annum.

The will of the late Mr. R. Tunstill, cotton spinner and manufacturer, of Monkholme, Brierfield, has been proved, the personality amounting to £174,600.

Mr. A. Hird, senior partner in the firm of Messrs. Timothy Hird and Sons, manufacturers, of Acres Mills, Keighley, died suddenly on the 6th inst. at his residence.

The firm of hosiery manufacturers, known as Drewery and Wallis, of Stamford Street, Nottingham, is now carried on under the name of Drewery and Edwards.

Probate of the will of the late Mr. Thomas Holroyd of Leeds, cloth finisher, who died in March last, has been granted, the personal estate being valued at over £82,000.

An English syndicate has purchased 640 acres of land in Chester county, 24 miles from Philadelphia, America, on which they intend erecting two cotton mills, each to contain 80,000 spindles.

The firm of Messrs. George Mayall and Co. has been registered as a limited company, with a capital of £100,000 in £5 shares, to carry on the business of cotton spinners, Mossley, Lancashire.

The Leicester Manufacturing Company has been registered, with a capital of £120,000 in £5 shares, for the purchase of Burton Street Mills, Leicester, for the manufacture of hosiery.

The Greenfield Mill Company, Limited, has been registered with a capital of £10,000 in £50 shares. They are bleachers, dyers, and manufacturers of waste, &c.

A company was registered on the 7th July, with a capital of £50,000 in £5 shares, to purchase and work the Apethorn Mills, at Apethorn, near Gee Cross, Chester.

James Entwistle, Limited, has been registered, with a capital of £5,000 in £10 shares, to carry on the business of spinners, doublers, and weavers, at Diggle or elsewhere.

A company is being formed to take over Messrs Broadfield's mill at Middleton, under the title of the "Irk Mill Co., Limited." The capital is £40,000, in shares of £100 each, the half of which has already been subscribed.

Mr. R. Worswork of Green Bank, Rawtenstall, who owns the Carr Hall Mill, working under the firm name of James Henry Ashworth and Co., has registered the same as a limited liability company, with a capital of £50,000, in £10 shares.

The firm of Kay, Ramsbottom and Co., Limited, has been registered, with a capital of £2,000 in £10 shares, to carry on the business of spinning, weaving, and sizing of raw cotton, wool, silk, &c., at Cheesden Mill, Spotland, Rochdale.

The London and Leicester Hosiery Company, Limited, has been formed, with a capital of £120,000 in £5 shares, to take over the hosiery manufacturing carried on for 14 years by Messrs. Shaw and Hackett of Nicholas, Leicester, together with a number of retail shops. This new idea will be closely watched by the trade.

The death is announced of Mr. Alexander Davidson, commission agent, and the representative of the Galloway Jute Company, from the effects of a chill caught at Lochee, where he had gone to reside for the summer months. Deceased was unmarried, and resided in Mayfield, Dundee.

The Second Division of the Court of Session has granted a petition by J. and J. Crombie, Limited, woollen manufacturers, Old Machar, Aberdeen, for confirmation of resolutions reducing their capital from £135,000 in 13,500 shares of £10 each, to £81,000 in shares of £6, the difference being paid back to the shareholders.

Mr. James Kerr, who for many years has been head of the great Turkey-red dye-works at Church, and also of works at Irwell Springs and at Sunnyside, has ceased to be connected with this firm. It appears that the agreement between Messrs. Steiner and Co. and Mr. Kerr having terminated, it has not been renewed.

Arrangements have been made for holding a national and colonial exhibition in Lyons in 1892. Two of the sections (silk and electricity) are to be international. The co operation of the French Chamber of Commerce has been invited. M. Henri Martin, 26, Rue de la République, Lyon, is the Commissary-General of the Exhibition.

The premises in Leith Walk, Edinburgh, which were acquired some time ago by Messrs. Munro and Co., have been fitted with the most improved machinery for the manufacture of tweed and hosiery. Although the firm has been in occupation of the place for a few months, it is little more than a week since they got into full working order.

Mr. Charles Lancaster, C.E., Manchester, is introducing the latest novelty in paper, viz, paper file-hafts and foot-handles, which are practically indestructible and very much cheaper than wood or malleable iron hafts. Placed under a steam hammer, they cannot be split or cracked, though, of course, they may be flattened.

Messrs. Thos. Houldsworth and Co. of Manchester and Reddish, have placed the order with Messrs. Fox and Williams of Manchester, for repairing and consolidating their massive steam engine foundations, at Reddish Mills, with their patent fusible metallic cement. The work has been most successfully carried out during the week-end, under the personal superintendence of Mr. Williams.

Mr. David Paton, the last surviving original partner of the firm of J. and D. Paton, tweed manufacturers, Tillicoultry, died July 13th, after a prolonged illness, at his residence at Alloa, in his 87th year. He took a prominent part in the affairs of Clackmannanshire, as a Commissioner of Supply and Justice of the Peace. Mr. Paton gave his entire fortune—£200,000—for missions, and, for the past few years, he lived on a small annuity, which had been purchased for him.

Amongst the many changes in the trade, we hear that the firm of Messrs. Woodward, Grosvenor and Co. have converted their business into a limited liability company, and, shortly, various extensions and alterations of their works may be expected. The management of their business will be continued on exactly the same lines as heretofore, and Mr. G. W. Grosvenor in Kidderminster, and Mr. Henry Mountford in London, will take as active a part in its management in the future as in the past.

The firm of Messrs. M. Whittall and Co. has dissolved partnership. Mr. G. M. Whittall, the senior partner, will carry on business under the style of G. M. Whittall and Co., on the premises at Stour Vale Works, lately occupied by the old firm, and, to enable him to commence business at once, Messrs. Woodward, Grosvenor and Co. have placed at his disposal part of their looms and machinery, until the necessary alterations consequent on dissolution are completed. Mr. Arthur and Mr. Alfred Whittall have taken the premises lately occupied by Messrs. Purdey and Co., where they will carry on business on their own account. It is arranged that both firms shall have authority to make all the patterns belonging to the old firm of M. Whittall and Co.

On Monday last, the death was announced of one of Belfast's most respected citizens. The name of Sir John Preston has been long and honourably connected with the linen trade of that town. He went to it when the place was only one-third its present size, and, engaging in the yarn and flax trade, he pushed forward his business with such marvellous energy that soon the firm of John Preston and Co. took a foremost place. He was Mayor of the town in 1877, a position he most worthily occupied. He had a seat at most of the public boards, was president of the Chamber of Commerce in 1873, and treasurer until his death. He was chairman of the County Down Flax Spinning Company, Limited, and, by his sound business capacity, placed it in the prominent position it now occupies in the commercial world.

Some time since the Saxon Textil-Berufsgenos-senschaft offered a prize of 1,000 marks for the cheapest and best shuttle-guard, which was to admit of general application. The appeal met, according to *Kuhlow's Review*, with a hearty response, not fewer than 60 persons, chiefly practical men, entering as competitors. The apparatus submitted have been carefully examined, and those that seemed superior to the rest subjected to a longer test, which extended from the beginning of the year until the middle of June. This was succeeded by another examination in the higher weaving school of Chemnitz, on June 23rd, by a prize-committee, assisted by a representative of the Government. The results have not yet been formally published, but a Leipsic contemporary has been privately informed that, in the opinion of the committee, the problem is not yet solved, but that they regard some of the methods proposed as deserving of special attention. They also see in the competition a proof of the interest which weavers take in the subject, and hint that methods at present in use can be followed up with satisfactory results without any excessive difficulty or sacrifice.

Applications for Letters Patent.

PATENTS.

Boiling, scouring, &c., fabrics. W. Hutchinson, Manchester. 3rd July 10,323
Bleaching cloth. W. Hutchinson, Manchester. 3rd July 10,324
Basting cotton cloth, &c. J. Kayser, Liverpool. 10th July 10,732
Bleaching, dyeing, or washing fabrics, warps, yarns. J. T. Reid and C. and A. Edmeston, London. 19th July 10,806
Braid (plaited) and apparatus. G. Becker, London. 29th July 11,838
Cutting pile fabrics. J. J. Mann, Manchester. 1st July 10,135
Clip for holding cloth. W. G. Hanna, Belfast. 2nd July 10,221
Cords and similar piled fabrics. A. Rothwell, Manchester. 11th July 10,760
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Combs or cards. W. de Courey Prideaux, Bristol. 15th July 10,999
Combing cotton and other fibres. B. A. Dobson, Manchester. 1st Aug. 12,039
Cutting corded fabrics. C. W. and T. B. Keighley and W. Netherwood, Halifax. 19th July 11,259 & 11,353
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Fabrics (pile) process and mechanism. A. Heald, London. 8th July 10,579
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Yarn dyeing. H. H. Lake, London. 29th July 11,873

Patents Sealed.

10,020	10,025	10,077	10,416	11,613	11,848	17,145	3,487
4,411	4,683	17,496	7,185	8,478	8,673	9,082	9,855
10,491	10,612	10,742	10,781	11,152	11,481	12,050	19,035
2,867	4,238	4,772	7,695	8,498	8,678	9,243	10,596
10,810	10,850	10,906	10,934	12,448	12,808	14,751	1,702
5,047	10,242	10,635	11,164	11,218	11,380	11,401	11,595
11,654	16,929	5,599	9,692	9,879	11,382	11,627	11,635
11,642	11,917	12,312	2,348				

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Analysis of Fabrics.

In our last issue, we pointed out a ready and reliable method of analysing fabrics for re-production, and explained, at length, the method employed for ascertaining the weight of cloth for a given width and for determining the counts of warp and weft. We propose, in the present article, to show the various means adopted for determining the material of which the cloth is made, and, in the case of mixture yarns (Angolas, &c.), how to ascertain of what the mixture is composed, and the relative quantities of each.

A common and ready way for finding the difference between animal and vegetable fibres is to burn some of the threads of yarn in a flame. The vegetable fibre is composed of carbon, hydrogen, and oxygen, while the animal fibre, in addition to these, contains nitrogen. By burning, the threads used in testing the first mentioned fibre will result in carbonic acid and water, while those of the latter, or of animal fibre, will result in combinations containing nitrogen, which element readily makes itself known by its peculiar smell, or disagreeable odour, similar to burnt feathers. Another point, which it is well to note, is the rapidity with which the thread composed of vegetable fibres burns, as compared with the thread having an animal substance as its basis. In the latter case, only a little bunch of porous carbon forms itself at the end submitted to the flame, and there is no flame, as in the case of the former.

Another method is to untwist the threads, and note carefully the appearance of the released fibres. If they are wool fibres, they will be waved in exactly the same way as in the raw wool—the finer the wool, the greater the number of waves or corrugations that will be shown. On the other hand, cotton fibres will maintain the same straightness which they show in the raw state. We might, with advantage, employ the microscope, as, by this means, we shall be able more readily to determine what is the nature of the fibres under observation. Under the microscope, wool fibres can be detected by the scales which are upon the surface, and which overlap each other after the manner of scales upon the back of a fish. This peculiar property belongs to all qualities of wool and hair. Cotton, under the microscope, shows as a thin transparent ribbon twisted, without any of the scaly appearance noticed in the wool, while silk has the appearance of a glass rod divided in the middle.

In some instances, owing to the effect of finishing and milling, and especially in the case of materials which have been previously worked up, the above tests may be unreliable, or so undefined that they can not be trusted. In such cases, we should have a means of testing or analysing, that can be depended on, both to determine, at once and with accuracy, the class of fibre or fibres that we are dealing with and the quantities of each, where two are mixed together. This can be done by a chemical analysis, that is, treating the cloth or fibres with acid or alkalies.

To detect cotton or other vegetable fibre in woollen or silk fabrics, one authority gives the following:—"Boil the sample to be tested in a concentrated solution of caustic soda or potash, and the wool or silk fibre will rapidly dissolve, producing a soapy liquid. The cotton, or other vegetable fibre therein, will remain undisturbed, even though boiling in weak caustic alkalies for several hours, care being taken to keep the samples below the surface of the solution during the operation. If, during this steeping process, it is exposed to the air, the cotton fibre becomes rotten, especially when the exposed portions are also, at the same time, brought under the influence of steam. (Any cotton fibres remaining from the testing, if coloured, may be bleached in chlorine water, and afterwards dissolved with cupra-ammonia.")

Professor E. Kopp gives the following test:—"Wool is only soluble in cupra-ammonia by the aid of heat. Concentrated acids, such as sulphuric, nitric, or, preferably, hydrochloric, act in the cold upon silk, but not on wool. The dissolving properties of cupra-ammonia, on all vegetable fibres, make it one of the most reliable of tests. Cupra-ammonia is prepared by suspending strips of copper, in concentrated ammonia, in a large flask, tightly corked, and occasionally shaken, so as to bring the metal in contact with the oxygen of the air. By degrees, a tolerably concentrated solution of oxide of copper in ammonia is obtained, which dissolves cotton and other vegetable fibres, leaving animal fibres untouched."

Professor Hummel gives the following test for detecting silk from wool or the vegetable fibres:—"The best solvent for silk is an alkaline solution of copper and glycerine, made up as follows:—Dissolve 16 grains copper sulphate in 140—160 cc distilled water, and add 8—10 grains pure glycerine (Sp. Gr. 1. 24); a solution of caustic soda has to be dropped gradually into the mixture until the precipitate at first formed just re-dissolves; excess of NaOH must be avoided." This solution does not dissolve either wool or the vegetable fibres, and thus serves as a distinguishing test."

Another method is given as follows:—"Concentrated zinc chloride, 138° Tw. (Sp. Gr. 1. 69), made neutral or basic by boiling with excess of zinc oxide, dissolves silk slowly, if cold, but very rapidly, if heated to a thick gummy liquid. This re-agent may serve to separate or distinguish silk from wool and the vegetable fibres, since these are not affected by it. If water be added to the zinc chloride solution of silk, the latter is thrown down as a flocculent precipitate. Dried at 230° to 235° F., the precipitate acquires a vitreous aspect, and is no longer soluble in ammonia."

In testing either cloths or fibres, where wool or silk is mixed with vegetable fibres, the better test is to use caustic soda, as this has less effect upon the vegetable matter than sulphuric acid would have upon the animal fibres—that is, if we subject a mixed yarn or cloth to the action of caustic soda, the soda would have, as shown in the above quotations, little or no effect upon the vegetable matter, while, on the other hand, if we treat it with sulphuric acid, there is a danger of the wool being affected by it, before the acid has entirely destroyed the vegetable matter, but it is best to be guided by the proportion of the two materials. If the cotton or vegetable matter predominates in the sample to be tested, it is better to use the alkali or caustic soda test, as it will destroy the wool or animal matter without disintegrating the sample, and thus allow the residue to be washed out without any fear of any of the vegetable matter escaping. On the other hand, if the animal matter predominates, better results would be obtained with the acid test, but, in using the acid, care must be taken not to have it too strong, or to allow it to boil very long, otherwise, some of the animal matter might be destroyed.

If the samples are undyed, the process is very simple, but, if dyed, the difficulties are increased, owing to the action of the acids used for mordanting, and the various colouring matters used in dyeing. These should be got rid of if possible, and, in most cases, subjecting the sample to boiling in a concentrated solution of hydrochloric acid will either remove the colour or render the material subject to the tests to be applied, but, after thus boiling, care must be taken to thoroughly wash away the acid and the impurities loosened by the process.

The method we should adopt in the case of dyed samples would be to boil, for two or three minutes, in the hydrochloric solution, putting the sample in while cold, so as to allow it to penetrate the sample, then, immediately, to thoroughly wash it and allow it to dry in a cool, airy place, after which we should carefully weigh it, and then subject it to either the acid or the alkali treatment, according to the above-mentioned rule. We should use about a 5 % solution, and put the sample in while cold, and gradually raise the temperature to boiling point, and allow it to boil for two or three minutes, and then wash off and allow it to dry

in a cool, airy place, so as to get it, as nearly as possible, the same temperature as before, when it is again carefully weighed, and the loss noted, and the percentage of loss calculated.

One method generally adopted is to dry the sample to be tested in a copper oven, heated by a bunsen burner to a temperature of 105° C, and then to weigh it and test it in the above manner, and, after washing, to evaporate the moisture, and dry to the same temperature before weighing, so as to ensure having the same amount of moisture on each occasion of weighing, but, when the sample is weighed at this temperature, it readily takes up moisture from the air in the process of weighing, and we find that, unless we get the accurate weight immediately, it will gain weight so quickly that, in the case of using a very small sample, our percentage of loss will be very far out. We should prefer (if the oven is used), to leave the sample in the air for a few minutes after drying, so as to get it the same temperature as the balance or scales would be, and then to weigh it. By this means, we could ensure getting the weight accurately, without it taking up moisture during the process of weighing.

Having stated at length the receipts and methods adopted by several authorities, we will give a complete analysis, as found by the above method, viz. :—drying the sample in a copper oven, and then allowing it to take up moisture from a room, at a temperature of 62° F. before weighing, and then subjecting it to the test, and again drying in the oven to evaporate the moisture, and allowing it to again dry in the air, before weighing it to ascertain the loss.

Weight of cloth = 8·0 grains.
After treating with the caustic soda = 2 67 grains, or 33⅓ % cotton.
Wool dissolved in the process = 5·33 grains, or 66⅔ % wool.

Warp weighed 1·14 grains.
After treating, ·40 grains, or 35 % cotton.
Wool dissolved, 74 grains, or 65 % wool.
Weft weighed 3·4 grains.
After treating, 1·05 grains, or 31 % cotton.
Wool dissolved, 2·35 grains, or 69 % wool.

In the above example, there is either more wool in the weft than in the warp, or else some of the short fibres of cotton have been lost in the working, owing to there being less twist in the weft. If we take the warp and weft together, we find the proportion of cotton 32·2 % against 33·5 % in the cloth, so that there has evidently been a slight loss in separating the warp and weft from the cloth.

Dry Finishing—The Shear.

In our examination of the operations of woollen finishing, we have reached another of those important points of division which separate the great classes of processes in the finishing department. For some time, we have been engaged upon the fulling, scouring, gigging, burr-dyeing, extracting, and drying. The subject of wet finishing has now been exhausted, and we return to the few important processes of dry finishing, which remain before the goods are ready for the market and for the consumer. We have noticed and discussed many of the difficulties which are constantly met with in daily practice, and have tried to give some notion of how these difficulties may be overcome. In our last article, we left our goods at the drying machine. The next important process is the shearing, and a most important process it is. The shearing is one of those operations in which it takes but a very few minutes to make or to mar a piece of goods, and to turn a fabric, which should be worth several dollars per yard, into a worthless piece of rag. For these reasons, it is a mistake for any finisher to leave his shearing to a raw recruit, or to unskilled or careless hands. Indeed, the shears, as much as, if not more than, any other machine in the department, require the constant and untiring attention of a man who is well used to his work. Every man who has had charge of a finishing room, and has had to put up with one or more "learners" at his shears, can testify to the truth of this assertion, and knows full well how extremely annoying is the imperfect work which such help is so sure to turn off. Look for a moment at the machine itself. It is almost a marvel of perfection. Quite like all other labour saving implements of the day, extensive and rapid improvements have been made in recent years, both in its manufacture and in its usefulness for the work in hand. We, at this date, can hardly imagine how crude and how unsatisfactory were the results and the uses of this great process, as it was at one time carried on. Shearing was at first performed by drawing the cloth tightly over the edge of a bevelled board, and clipping off the nap *by hand*. For this purpose, a pair of clumsy shears was used, not so very much unlike those now employed by wool sorters in their work. Can we imagine what an awkward and unhandy process this must have been? Surely we ought to be thankful that we live in the present age and generation, where such rapid advancement has been made on old and clumsy methods, and when all that can be done by machinery is done so easily and so well. About the first attempt at a machine shear was the old-fashioned drum-shear, with a revolver of only two cutters. These gave place to the revolver of four cutters, and, finally, the number was gradually increased, along with other improvements, until we now have our cutters running as high as thirty, or more, in number. At first, ledger blades were made, with the iron placed more on the front side of the blade than they are at present. This rendered it necessary to grind the face of the blade quite often, in order to keep the iron below the steel. These are only some of the steps in the gradual advance to the perfection of to-day. Before the goods are put on the shears, there are one or two points which must be attended to. In the first place, we have found it a very good plan not to take the goods directly from the dryers to the shears. It is a fact that, from the peculiar nature of the wool fibre, the fabric will not work so well in the dry finishing, if the goods are shorn down while they are warm, or almost hot, from the dryer. It is thus found advantageous to allow the cloth from the dryer to lie in a cool room until it is well cooled down, and then the shearing and friction from dry beating do not give rise to the production of electricity, and also hinder proper results from being attained in the pressing and steam brushing. This plan is not in general practice, but it will warrant a trial, and then each man may judge for himself. In the second place, no piece of cloth should ever be taken to the shears until it has been thoroughly back-burled, and especially is this necessary on valuable and high priced fabrics. Be careful to see that every knot or bunch, of whatever kind, is completely removed. We think it will be found best not to use the burling irons for this part of the work, but, if they are used, it should only be with the greatest care. It will be more desirable to use the scissors and irons, pulling up the knot, and then carefully cutting it off. It is evident that, by using the irons alone, there is great danger that too much of the thread may be pulled out, and thus make more work for the drawer in. Consequently, if, by the use of the scissors along with the irons, we may save after work, there is no reason why such a course is not desirable. When the goods are put on the shears, be careful that a fine, neat, sewing is made at the ends. Before this, when the piece is put in the box or rack, the number should go in first. We say this, because, as a rule, the number end is always taken first through all the processes, and, consequently, the nap lays from the number end, downwards, toward the heading end of the cut. This, however, varies with practice. Regarding the sewing of the ends of pieces of cloth to be sheared, after one piece is in position, we find that some finishers recommend and use a sewing machine for the purpose. The main reason for this is that, by such means, a nicer seam can be made, and a considerable saving of time can be effected. This, however, we consider is a question. It is quite possible to sew the ends together by hand so neatly and expeditiously as to answer all practical requirements. All that is necessary is that the seam be tight and the stitches short and even. The better appearance of the ends of the piece after it is finished will more than repay the shearer for all the trouble taken in making a careful seam. It will also enable the shearer to make the ends of his piece compare exactly with the middle. If, on the other hand, a loose and uneven seam is made, there will surely be a yard or so of streaked, bad work, at both ends of the cut, which can only be seen and appreciated after the piece has been finished. After the piece is run into the shear, it is necessary to set the blades for the best results. On the first cut particularly, these should be set off just enough to trim the nap lightly. It is here, we have not the slightest doubt, that most of the shears are dulled and put out of order. The nap, when the piece is first put in the shears, is, of course, all on, and it is also of considerable length. Unless, then, the blades are set off, or up high enough, there is a heavy strain brought to bear upon them, which cannot help but have a tendency, not only to dull them, but also to spread them apart. The heaviest strain of the whole shearing process will most likely be on the first cut or run, and hence the greatest care must be taken not to have that cut too heavy. On the contrary, it is not advisable to set the blades too far off, as little or none of the nap may be affected, and, hence, the whole run is but a waste of time. Judgment must be brought to bear, and after a little has been done, it will be plainly seen whether the position of the blades is correct or not. There is no use whatever to try to lay down accurately the exact number of notches to be counted off for each different grade of cloth. This is a point which, from its nature, must be left to the shearer's experience. After the machine has been started is the proper time to determine whether all is right. If the blades are taking off too much, the flock will be carried along with the revolver and thrown over on the cloth in front. This is what spoils and ruins the cutting qualities of the blades quicker than any other one thing, and should always be most carefully guarded against. When once our first run has been successfully done, lower two or three notches and give another run, let down again two or three notches and give another run, and so on till all are let down. After this, it may be best to give the piece five or six runs to smooth down the face nicely. However, it is not necessary that a piece of goods with a thin, short, nap should receive so many runs. But fancy cassimeres, unions, and doeskins, which are fulled for a considerable length of time, should all be shorn down slowly, since such a course of treatment will be sure to result in a far better appearance of the finished fabric. The face of the goods will not look then as though part of the nap had been pulled out and the rest dragged and pressed down, thus concealing the colours and impairing the clearness of the design. More than all this, the shears themselves will not require as frequent grinding, nor are they so apt to get out of order as when goods are hurried over with just as few runs as possible. And we all know that the less grinding is done the better is it for all concerned, for it is not possible to grind without running great risk of putting the shears out of truth. As we said above, the running and work of the shear requires the most careful attention. Further than this, the shear itself needs quite as much care to keep it in good running order. The machine must not only be started right, but it must be constantly under the eye of a competent man. A comparatively slight

piece of neglect may cause a world of trouble. A very important point to be taken into consideration in the care of the machine is that which deals with its position and arrangement with its surroundings. Light is a primary consideration. Be careful to have the machines placed facing toward a row of good, large windows, in a dry corner of the room. This will not only be a great convenience to the shear attendant in her work, but will also save the fixer much annoyance whenever his services are called into use. Another requirement is a solid foundation on which the machines may be set, and on which they may remain so. This is by no means an unimportant point, because, with a machine which is intended to do such fine and often delicate work as the shear, it is no small element in the success of the process. Before starting a newly placed shear, be sure to see that the brushes, rests, and carriage, are perfectly level and rigidly firm. Again, in connection with the care which the machine should receive, we must not forget the oiling. If the swab is not oiled often, and properly, too, there will be trouble on out ledger blades, the temper will be drawn, and the cutting qualities impaired. If the revolver bearings are not kept well lubricated, they will soon wear down and cause trouble also. And so it is all through the machine. We may look for innumerable annoyances, unless the machine itself is properly cared for. Still, we must bear in mind that it is quite possible to overdo the matter and spend much time, to no possible advantage, in tinkering here and there about the machine. Do not make a mistake in this extreme. If a few pieces happen to come along imperfectly sheared, do not run off for a wrench and file and overhaul and alter the whole machine. Almost invariably such a course will only result in greater and more widespread disaster than ever. And, moreover, in many such cases, the difficulty arises not from any defect in the shear, but from some outside cause, such as uneven filling, poor relayers, listing too loose or too tight, or numerous other mistakes over which the shear and shearer have no control. Try always to find the true cause of the difficulty before attempting to remove it. The fact that there is abundant room in the shear itself for many and many a trouble, no one denies, but the removal of a supposed cause of trouble often seems to make matters worse, since, we cannot always be sure that we have hit upon the right thing. Bad brushes, brushes set unevenly, improper friction, dull blades, rest loose, brushes filled with greasy flocks, poor swab, or unevenly oiled swab, or an uneven blade, are some of the troubles which are likely at any time to make their exceedingly unwelcome appearance. But it is plainly evident that to grind the ledger blades, or file the rest, will in no manner remedy an evil caused by some of the other machinery. And even if we managed to get our shear so that it would work well on an imperfect piece, then, when a piece comes along that is right, we are in just as bad a fix as ever. To close, let us say that it is best never to file the rest at all, since, once a part of it has been removed, it can never be replaced. But if, after the position and accurate judgment and experiment, we find that the rest is actually out of true, we should send it to the machine shop and have it returned in perfect order, then scrupulously leave it so.—*Boston Journal of Commerce.*

The Yorkshire College.

TEXTILE INDUSTRIES AND DYEING CLASSES.

The reports of the heads of the departments in the Yorkshire College for the sixteenth session have been issued, and show that some excellent work has been done. In the textile classes, an endeavour has been made to teach on the lines of instruction inaugurated by the late Professor Beaumont. The improvements in the curriculum have involved more lectures, &c., and the practice of a wider range of experiments in the weaving and finishing rooms. A new series of lectures on figured designing has been given to the senior classes, in which no effort has been spared to deal with the principles of developing ornamental patterns in the loom, and, at the same time, to create a feeling for the more elaborate branches of weaving. The beneficial consequences of these lectures are apparent in the merit of the original designs submitted for the annual competitive examination. Many of these are interesting in ornamental and technical detail, displaying creditable knowledge of the weaver's craft, and trained executive skill. Such has been the intensity of the competition for the prizes offered for designs that the examiners have experienced some difficulty in making the awards. This is increasingly gratifying, considering that the standard of the examination in designing has been raised, while the number of the prizes has been reduced. When deciding upon the successful works, the methods of putting the designs into practice were carefully taken into consideration, and the distinctions gained by some works are partially due to the superior technical knowledge evinced by the candidate producing them. On account of the exceptionally large number of fourth year evening students joining at the beginning of the session, it was found necessary to commence a class to meet their special requirements. This is the first fourth year evening class held at the College. It has been attended by about twenty students, some of whom are manufacturers, and others are engaged in the textile concerns of the town and district. They made a request to have instruction in figured designing only. *A propos* of this subject, it may be mentioned that, during recent years, there has been established in Leeds, and the immediate locality, a trade in figured mantlings, which undoubtedly owes its origin, and, in some measure, its development, to the operations of the College textile classes. In addition to the information imparted on designing, some sixty lectures have been given during the session on the principal types of woven fabrics, the construction of weaving machinery, materials, yarns, and the processes of manufacturing. Referring to the practical work, so invaluable to efficient textile teaching, it has been made even more comprehensive than in past sessions Looms have been mounted for designing in silk handkerchiefs, quiltings, woollen curtains, and fancy cotton dresses. Moreover, all the facilities for experiment in design, and for the investigation of weaving principles, which the admirable equipment of the department afford, have been utilized, resulting in the production of a completer set of samples, covering a larger diversity of goods, in wool, worsted, cotton, and linen yarns. The pattern books kept by the day students give the most conclusive evidence of the adaptability of the scheme of study, at present in force, to the needs of the textile industries. Even those compiled by the elementary students contain a creditable range of fancy patterns. The annual competition for both day and evening scholarships has been exceptionally intense, some thirty candidates having sat for the latter. Several important alterations in the textile courses have been sanctioned by the board of science, technology, and arts, and by the textile committee for next session. First, the courses of instruction are to comprise three separate schemes of study, namely, that of the certificate of proficiency, that of textile industries and art, and that of textile industries only. Each scheme covers a three-years' course of study. Students passing the examinations in connection with the first scheme—which includes, in addition to the textile course, the subsidiary subjects of engineering or dyeing, art, and a modern language—will obtain a certificate of proficiency in designing and weaving, or in cloth manufacture. No scheme is compulsory, the student being allowed to select the course best adapted to that branch of textile work in which he intends to be engaged. Further, three new courses of lectures are proposed for day students, comprising two courses in textile colouring, and one course in cloth finishing and the construction of finishing machinery. It is gratifying to report that the success of the dyeing department not only continues but gradually increases, the number of students in attendance having been greater than in any previous session. It is pleasing to learn, also, that the students still continue to gain appointments; indeed, there are now more applications than can be met for young men to assume the management of dyeing operations in manufactories of various kinds, as most of the students eventually enter their fathers' works. Since the issue of the last report, one student has undertaken the direction of the dyeing department in an important hosiery manufactory in Leicester; another occupies a similar position in one of the Perth Dyeworks; a third (an evening student) has been appointed to a like position in a Bombay works; and a fourth is engaged in one of the carpet works of Kidderminster. The training of students, in a thoroughly practical manner for their work in life, by means of experiments in pattern dyeing, must ever form the chief aim and work of the College dyeing department, for by this means alone can they be able to enter and at once be useful in the works' dyehouse, as instanced above, nevertheless, it is well to bear in mind that there is a higher type of work, though perhaps of less immediate utility, which lies before us. The art of dyeing owes much to science, and, in a University College like this, it is not unreasonable to expect that students of the art should, in return, contribute something to science, more particularly, of course, to that branch of it which pertains to dyeing. Hence, a research laboratory, devoted mainly to unravel the chemical problems connected with dyeing and dyeing materials, would be but a fitting adjunct to the already commodious buildings, and, indeed, such an addition seems necessary to give completeness to the means of instruction provided in a dyeing school which aims at being in the front rank It is to be hoped, therefore, that, as opportunity occurs, facilities will be afforded to advanced students for extending the boundaries of the science connected with dyeing, for to learn and then to contribute to the sum of human knowledge is surely education in the best and fullest sense of that term. The increase in the number of students above referred to having being already manifest at an early period of the session, it was deemed desirable to place, in the experimental dyehouse, another high-pressure steam dye table, similar to those already in use This has now been erected, and completes the equipment in apparatus of the dyehouse. The general work of the department has been, on the whole, similar to that of former years, nevertheless, the work of each year bears its own character. The special feature of this session's work is that particular attention has been devoted to cotton dyeing, in addition to the ordinary work of the regular courses of study. This was rendered possible, not only by reason of the large number of students, but also because the average time spent by them in the dyehouse was longer than heretofore. Advantage was therefore taken of this fact in order to systematize the course of instruction in cotton dyeing, and thus to bring it on a level, in point of completeness and conciseness, with the course of wool dyeing, which has been elaborated during previous sessions. Greater attention to cotton dyeing was also necessitated in consequence of the largely increased number of the so-called Congo colours derived from coal-tar, a class of colouring matters specially applicable to cotton, and rapidly growing in importance. As the work has progressed, new facts have been discovered, which are of practical importance in connection with the application of these, as well as of the older, basic colouring matters. Serial articles, embodying noteworthy results of the students' work like those alluded to, have now for some time been regularly contributed by the department, through

the instrumentality of the assistant, Mr. W. M. Gardner, to various English, German, and American periodicals, and there is reason to believe that the publication in this manner of the results of the work is much appreciated. In connection with the usual lectures on fibres, colouring matters, &c., increased interest has been introduced, by adding largely to the number of optical lantern slides employed for purposes of illustration, and this too at a much lower cost than would have been possible by means of the diagrams formerly in vogue. The attendance in the evening classes still continues satisfactory, under the regulations referred to in the last report. Although only an elementary course of lectures is advertised in the College calendar, an advanced course, dealing with the coal-tar colours, was also given, in accordance with the request of some of the second year students, but, as in former years, the number attending fell off towards the end of the session, the fact being that evening students of the artisan class have usually an insufficient knowledge of organic chemistry to enable them to master the details connected with these highly complex colouring matters. On the other hand, the interest of all the students in the work of experimental dyeing was very marked. It is worthy of note that several evening students (foremen dyers and apprentice dyers) attend three or four successive sessions, and some return again and again, after an absence of a few years, in order to study the dyeing properties of colouring matters introduced in the intervening period. This appears somewhat strange in the case of those who spend their whole time in the works' dyehouse, but the explanation, probably, lies in the fact that facilities for experimental dyeing are not generally provided in dye-works, neither has the dyer the necessary time to carry on experiments during the day. In the case of such dyers, therefore, the wish to keep themselves *au fait* with the new and improved colouring matters, and their behaviour in the dyebath, leads them to attend the evening practical classes from time to time, and it may be concluded, therefore, that, by this means, the trade generally is benefitted by the evening work.

Action of the Chlorides of Calcium and Magnesium upon Cotton.

The use of these chlorides is now so common in the preparation of sizes for finishing cotton goods that the following observations of Grimshaw are of great importance and will, perhaps, explain the deterioration which has been lately sometimes observed in cottons. "It is not a new observation that, when the chlorides of calcium and magnesium are heated in contact with air, a portion of this chlorine is given off. In view of the very large quantities of both these substances used in the sizing and finishing of cotton and other goods, it is evident that it is of considerable interest and importance to define at what temperature, at how low a temperature, in fact, and to what extent, the decomposition of these salts proceeds, because, if the chlorine is liberated at temperatures to which it is at all likely that the fabrics containing them may be subjected under the ordinary conditions of their use and manufacture, then the chlorine, or resulting hydrochloric acid, will be certain to cause more or less deterioration of the fabrics. We know that, at a red heat, the chloride of calcium becomes alkaline to litmus, and that, at temperatures considerably lower than this, the chloride of magnesium parts with an appreciable amount of its chlorine. Recently, several cases of deterioration of the strength of cotton fabrics have been traced to the action of chloride of magnesium, and we may take it, I think, as an undoubted fact, that this "tendering" of the cotton fibre in such fabrics is due to the action of the hydrochloric acid formed by the decomposition of the chloride. I am making an attempt to define, with accuracy, the lowest limit of temperature at which the decomposition of the chlorides of calcium and magnesium, and, incidentally, the chloride of zinc, takes place; the extent of the decomposition, and the influence that time, and the presence of moisture, have upon this, and I am able to give some figures which, though only of a preliminary nature, are of interest on some of these points." These few preliminary experiments would appear to establish the fact that, at any temperatures which can possibly prevail in the manufacture or use of goods containing the calcium chloride, this salt is perfectly stable, and no fear of deleterious action need be entertained, whilst the reverse is the case with the magnesium chloride. The figures for the latter show that this salt is decomposed comparatively readily at a low temperature: a temperature of 117° C. is one which, in some operations, the fabric may easily attain, and it would appear likely that an even lower temperature may affect this.—*Journal of the Society of Chemical Industry.*

Nigrisine.

The *Moniteur de la Teinture* contains an article by Baumann concerning this new colouring matter, and we give below the results of Baumann's studies upon the use of this colour. Nigrisine, the new basic gray, was discovered by Ehrmann, and is furnished to the trade by the St. Denis Company; it has just appeared on the market. It is in the form of a black powder, perfectly soluble in water, acetic acid, and muriatic acid. Nigrisine dissolves in water with a reddish-gray colour, which is changed to grayish blue by the addition of acids. It will find employment in printing and dyeing on account of its purity of shade, its good colouring power, its fastness, and the variety of shade which can be produced by mixing it with other basic colours which can be applied in the same way. It furnishes dark and light grays of great purity. The two following receipts are given:—

	Dark Gray.	Light Gray.
Nigrisine	4 parts.	1 part.
Acetic acid 6° B	20 ,,	20 parts.
Water	20 ,,	25 ,,
Gum water	51 ,,	50 ,,
Tannin	8 ,,	2 ,,
Tartaric acid	1·5 part.	1·5 part.

The shade can be made heavier and bluer by increasing the proportion of tartaric acid, but with the risk of attacking the fabric, if the cloth is weak. This acid dissolves well in tannate of nigrisine, even in the presence of an excess of tannin. Another property of this colour renders it capable of being fixed upon bleached cotton directly. A steam colour made with nigrisine and without tannin gives a very good result. Reddish-grays are thus obtained, they are less beautiful than, but are as fast to soap as, those made with tannin. The following receipt, which does not contain tannin, can be used:—

Nigrisine	4 parts.	Gum water	50 parts.
Acetic acid 6° B	20 ,,	Tartaric acid	1·5 ,,
Water	25 ,,		

After steaming, wash strongly, and soap. The colour can be still more firmly fixed in this case by chroming after steaming and then soaping. This formula gives equally good results upon cotton, silk, and wool. Nigrisine will dye bleached cotton directly. For dyeing, use 1 to 3 per cent. of colour, which will give full shades. It is necessary, however, to acidulate the dye-bath with little acetic acid: this blues the shades. The colour takes well upon cotton mordanted with tannin and tartar emetic, as is usually the case with basic colours. Nigrisine can also be used for padding, the goods to be dried by hot air, and then steamed, or the colour can be fixed as follows:—After padding, pass the goods, without drying, through a bichromate bath, containing one-half of 1 per cent. of bichromate, at a temperature of 180° F: an insoluble chromate is formed in the liquid. Nigrisine will take upon bleached cotton, even in the presence of muriatic acid. This colour will certainly find lasting employment. In fastness to soap and to light, in easy application and in cheapness, it leaves little to be desired, particularly if compared with the grays previously known.

Artificial Silk.

Mr. Vivier's new method of making silk out of cotton or wood cellulose, which, it is thought, bids fair to rival the already well known process of M. Chardonnet, is described at length in the columns of La Revue Industrielle. The material is obtained by heating tri-nitric cellulose, obtained by alkalization and nitrification of cotton, with a mixture of acetic acid and gelatine, or other equivalent re-agents. This material is transformed into pure filaments, which are a little less tenacious than natural silk, but quite as lustrous, and cost, according to the inventor, about sixty-eight cents per kilogramme, or about thirty-two cents per pound of yarn. The first part of the process consists in the economical and rapid manufacture of pyroligneous acid, from which is then easily extracted the crystallizable acetic acid necessary for the elaboration of the filaments. The succeeding processes are three in number:—(1) The preparation of the tri-nitro-cellulose; (2) its treatment by acetic acid; (3) its treatment by the re-agents which convert it into silk, or, to be more exact, into a silky material, which must then be transformed into silk again. Taking these processes in their order we have:—

(1) THE PREPARATION OF THE TRI-NITRO-CELLULOSE.

This comprises two operations, alkalization and nitrification. The alkalization of the cotton is effected by treating it with an ammoniacal solution of caustic soda. For this purpose, four kilogrammes of caustic soda are dissolved in twenty litres of water, and to this solution, after it has cooled, are added ten litres of commercial ammonia at twenty-two degrees Be. One kilogramme of cotton is steeped in this solution of ammoniacal soda for three days and three nights, and stirred once a day. The cotton is then pressed and washed in water up to complete neutrality. It is next carded, after drying, in order to open the fibres so as to prepare it for nitrification. Nitrification is effected in an apparatus with a capacity of about 120 litres. This apparatus is charged with about twenty kilogrammes of saltpetre, dried at forty-five degrees, on which are poured, at two or three times, thirty kilogrammes of pure sulphuric acid at sixty-six degrees Be., the mass being stirred until the ingredients are thoroughly mixed. It should then have a temperature of eighty-five degrees. Into this liquid, at this temperature, tufts of cotton are introduced in small quantities. The apparatus is closed and made to revolve, with a double revolution, round its horizontal axis, and round its vertical axis, for five or six minutes. Then it is stopped, the lid is lifted, and the material dropped into a tub of water. After washing and drying in an oven, the nitrated cotton is ready to be used for the preparation of silk.

(2) THE TREATMENT BY ACETIC ACID.

Three solutions are prepared:—*(a)* A solution of gutta-percha in sulphide of carbon; *(b)* a solution of isinglass in crystallizable acetic acid; *(c)* a solution of tri-nitrated cotton in acetic acid. These solutions are mixed cold, so as to obtain a final solution in which

the pyroxiline or tri-nitrated cotton forms seventy per cent., the isinglass twenty per cent., and the gutta-percha ten per cent. To this is added a very small quantity of glycerine or castor oil, and the whole is blended together in a mixing apparatus. After this mixing process, the material is twice filtered, first roughly, and then more delicately.

(3) ITS TREATMENT BY RE-AGENTS, WHICH CONVERT IT INTO SILK.

There has been obtained, by the preceding methods, a semi-fluid viscous substance, which is made into a filament, under water, by driving it through a small orifice. The thread thus produced passes, with the aid of appropriate machinery, through the following described six chemical baths:—

(*a*) A bath of soda to remove the excess of acetic acid.
(*b*) An albuminous bath (of three per 1,000), to make the fibre supple.
(*c*) A bath of bi-chloride of mercury (twenty-five per 100), to coagulate the fibres. The coagulation is accelerated by passing the material afterwards through an atmosphere of carbonic acid.
(*d*) A ten per cent. solution of ammonia.
(*e*) A bath of sulphate of alumina, which impregnates the fibres with a deposit of alumina. These last two baths are intended to lessen the combustibility.
(*f*) A second bath of albumen (three per 1,000) to render the fibre supple.

The proportions can be varied to a certain extent, or even replaced by equivalents, according to the particular results which it is desired to obtain. The filament which remains, after this series of chemical processes, is now wound upon a drum, before which a carriage is made to travel by means of a worm. This carriage is provided with burnishers, which polish the thread, and with guides, which ensure its regular arrangement on the drum. When the drum and its fibre have been dried in a stove, the latter is carried to the winding machine. The bobbins of fibre thus obtained are next carried to the twisting machine, where the yarn is formed by twisting together a number of filaments sufficient to constitute a thread. The filaments on the bobbins, which are reeled as they turn round their common axes, are twisted into one single thread, before reaching the drawer, which takes the thread to the reel. The shafts are hollow, so that, if desired, a liquid jet can be projected on the thread as it is forming.

In connection with the above, a short account of the way in which another distinguished inventor, M. Frémy, proposes to meet the very grave difficulty connected with the use of all silk of this kind, namely, its tendency to blaze up like gun-cotton, owing to the presence of the nitric compound, combined with the cellulose, is also interesting. This nitric compound is eliminated by M. Frémy in the following manner:—The vegetable silk is treated cold, with a dilute solution of the sulphohydrate of ammonia. The nitric element in the tissue is thus rendered soluble in water, and is entirely absorbed by the sulphurous compound. The fibrous cellulose principle remains in the insoluble state, and can be purified simply by washing in cold water. This action of the sulphohydrate of ammonia on vegetable silk is so rapid that it is complete in a few hours, and so thorough that the resultant fibre does not burn more quickly than threads of cotton. The denitrated silk preserves all its original properties. It is tenacious, it is as glossy as the purest silk in the market, and is not more inflammable than cotton yarn.—*The American Silk Journal.*

New Patented Fabrics.

MANUFACTURE OF CARPETS, MATTING, TWINE, &c., FROM ESPARTO GRASS.

This invention relates to an improved process of treating esparto grass, so as to adapt it for use in the manufacture of carpets, matting, door-mats, ropes, twine, and other goods of a similar nature. According to the invention, the esparto grass is placed in a tank and covered with water to macerate it, the grass being held down in the water by weights or other suitable means. This maceration is continued for a period of from seven to thirty days, according to the quality and state of the grass, the temperature, and other local conditions. In order to facilitate the maceration, caustic soda, caustic potash, or the like, is added to the water, in the proportion of from five to fifteen pounds to each ton of grass under treatment, or, in the case of some qualities of esparto grass, hydrochloric, nitric, or sulphuric, acid is added, in about the same proportions. By using these materials, a period of from three to fourteen days is sufficient for effecting the maceration. When the grass has become soft and pliable, and when the fibres can be easily separated, water is allowed to run in at the bottom of the tank and to overflow at the top, for a further period of from seven to thirty days, or until all trace of the chemicals used is removed. When the grass has acquired the desired softness, the water is run off, and, when thoroughly drained, the esparto grass is taken out and passed through a pair of rollers, to press out the superfluous water, care being taken not to press it too dry, as, if this is done, it will harden and become unfit for, or difficult of, future treatment. The grass is beaten under wooden beaters to partly disintegrate the fibre, and especially the hard bottom ends of the grass. It is next passed through grooved steel or iron rollers and, lastly, through smooth rollers, which complete the disintegration of the grass. It is now carded either by hand or by machinery, when it is ready to be spun into ropes, twine, and yarn. When in its carded state, or after being spun into twine or yarn, it may be dyed, and can be woven into matting, carpets, and the like, either plain, or with one or more colours. The carpet, when completed, is preferably passed through polished, hot, rollers to finish it, or it is finished by sizing, or in some other suitable manner.

DOWN QUILTS AND DOWN QUILTED GARMENTS.

This invention relates to quilted goods of that class which are filled, or partly filled, with down, feathers, or the like, such as quilts, quilted beddings, petticoats, and other garments. As is well known, hitherto the quilting of such articles has consisted simply of rows of stitches, generally made very close. However carefully the goods have been made, the down, or other filling, has been apt to "creep out" through the stitching, especially when the articles have been in use for some time. According to this invention, to the two layers of material, from which a quilt or other article is to be made, some suitable adhesive is applied to the inner or "wrong" side of the fabric, for instance, a suitable india-rubber cement, but, preferably, sheet gutta-percha, in narrow bands or strips, following the intended design of the quilting. The two fabrics are then placed together, and firmly united, leaving suitable openings at the edges for the introduction of the filling material. After the putting in of the filling material, these apertures are also closed by uniting the edges, and the article is then ready for use. In some cases, however, stitching along the lines of the design is added. If required, perforations may be made along the lines of the design to allow ventilation, which may, in some cases, prove desirable.

Regulations respecting Commercial Travellers.

Argentine Republic.—Commercial travellers in the Federal capital of the Republic are obliged by law to take out a broker's license, inasmuch as their occupation or business is no other than the itinerant sale of merchandise in consideration of a commission which they receive from their employers. In the event of the traders in question leaving the territory of the capital and proceeding to any of the provinces to pursue the same business, the licenses above mentioned cease to be valid, and they remain subject to the regulations which are in force on the subject in each province.

Brazil.—Travelling dealers, or pedlars, as they are denominated in the regulation annexed to the Decree, No. 9,870, of the 22nd February, 1888, are subject to the following taxes:—1. As regards the general revenue, to the taxes mentioned in Schedule (A) of the said regulation, which, at p. 53, specifies, under the word "pedlar," the different descriptions of this class, and the schedules in which they are included, the taxes also varying according to locality. 2. To the tax due for the licenses to be obtained from the Municipal Chambers, to enable them to follow their trade in the places which they desire to traverse. 3. To the duties denominated hereto "provincial," but actually belonging to the revenue of the State of this Republic wherein their trade is followed. In these two last cases, the taxes vary according to the municipality of the State traversed by the dealer. As regards other municipalities forming the limits of the actual States of Brazil, municipal legislation is generally uniform; bearing in mind, however, that, in virtue of Article 2, paragraph 4, of the decree of the 20th November last, the powers conferred by the Additional Act on the extinct provincial assemblies regarding the settling of municipal expenditure, and dues necessary for same, have ceased to exist.

Rio de Janeiro.—Art. 44. The Municipal Chamber is authorized to collect from 20 to 100 milreis for annual licenses granted to pedlars who trade within the municipal district, according to the value of the goods they deal in, which shall be regulated by a table, subject to the approval of the Government. Table of taxes payable by pedlars for annual licenses granted to them to carry on trade within the municipal district of Rio de Janeiro:—License for hawking cotton goods, 100 milreis. License for hawking haberdashery and small ware manufactured of tin, iron, or other metals, 20 milreis.

Japan.—There do not exist in Japan, at present, any special regulations with regard to commercial travellers. Under existing treaties, no foreigners are allowed to travel in the interior of the country for purposes of trade, and at the open ports, Tokio, Yokohama, Hiogo, Nagasaki, Hakodate, and Niigata, commercial travellers are allowed, in common with all other foreign traders, to pursue their calling within the limits of the settlements existing at these places, and are not obliged to pay fees or to take out licenses.

Mexico.—No tax is levied by the Federal Government, but, in certain States, the local authorities require commercial travellers to notify their arrival, and to take out monthly licenses for the time they may be carrying on business in the State. In the States of Jalisco and Nuevo Leon, for instance, commercial travellers, before being permitted to open their samples, have to pay 100 dollars (or about £16) as a State, and 25 dollars (or about £4) as a Municipal, tax. It is a little lower in some States, as Cochinla, where the State charges 75 dollars, (£12), and the Municipality, the same as in Jalisco.

In the following countries, commercial travellers are not obliged to pay fees or to take out licenses:—Colombia, Ecuador, Egypt, Morocco, Falkland Isles, Chili, Persia, Peru, and in most of the United States, but in Texas a license of 50 dollars per annum is charged.

Original Designs.

On our first plate, we give a design for a Curtain, suitable for Tapestry, Chenille, or Printed goods.

* * * * *

On our second is a pattern for Dress Goods, which is also well adapted for a Mantle Cloth.

* * * * *

Our third page contains a Curtain design, suitable for a variety of materials.

Monthly Trade Reports.

COTTON.—A fair amount of business was done during the earlier half of the month, especially for the Eastern markets, but orders were directed chiefly to the better qualities, the production of which was already well under contract. Within the past fortnight, the demand has distinctly fallen off, and the progress has been slow in nearly all departments. Business for the Continent has been moderate, and the same may be said of most of the foreign markets. For China and Japan, the demand, which has ruled fairly good, has been chiefly for the finer qualities of shirtings and the better makes of sheetings and drills. The home trade has shewn little alteration since our last report, but, where easier rates have been accepted, good orders have been booked for forward delivery. On the whole, an average business has been done, during the month, in both the yarn and piece branches.

LACE.—There has been a slightly improved feeling in some departments of this industry, manufacturers of plain and fancy silk goods having booked moderate orders, and there are signs of a revival in this class of laces, after a long and severe depression. Fancy cotton laces and trimmings have improved a little. The demand for curtains, vitrage nets, and furniture laces, has been above the average, the first mentioned being the most cheerful branch of the lace trade at present. Plain and fancy tulles in silk have had more inquiry, but the cotton bobbin net trade remains unaltered, there being little required. Prices keep very low.

LINEN.—In nearly all departments of the linen trade, an average business has been done during the month, and, generally, a very cheerful aspect characterizes the industry. A steady demand has ruled for sheetings, ticks, pillows, and other kinds of bed fabrics, and the same may be said of diaper, crash towellings, and huckabacks. Plain and fancy drills have had a fair inquiry. Damasks in light weights have sold moderately. Carpeting and crumb cloths have been rather quiet, as have also drabbets and bluettes. Domestic cloths generally have met with a steady demand. Prices remain unchanged.

WOOLLEN.—This branch of trade keeps, with slight exceptions, fairly good. The recent wet weather has had a rather bad effect as regards repeat orders, but, notwithstanding this, the general run of the trade is satisfactory. The worsted departments, especially those in fancy goods, have remained busy, fair orders having been booked, and the same may be said of serges, which are still taking a strong lead, and seem likely to do so for some time to come. The tweed branch, especially in the lower makes, is rather quieter, owing to the late unseasonable weather, which has had its effect on the ready-made clothing trade. Manufacturers of heavy goods, as made in the Batley and Dewsbury districts, are rather busy, the demand being principally for foreign and colonial houses. Generally, higher rates for fabrics, for which there has been a fair request, have been the rule, and manufacturers keep firm to their prices.

WOOL.—The chief drawback to the wool trade just now seems to be the uncertainty respecting the U.S. American tariff, and, although there is little hope in its provisions for manufacturers and spinners, still the uncertainty has its effect on the trade generally. In wool, there is little new to note. The consumption of raw material has been less than the average, but prices have kept tolerably firm. English wools especially have maintained their value, and staplers show no disposition to concede in rates. Spinners have also remained firm as regards prices for new contracts, and a fair number of orders have recently been taken, and for yarns, made from English wools, they demand extreme prices. Manufacturers are not busily engaged, although a slightly better feeling has prevailed during the latter part of the month, and a few orders have been booked, both for the home and the colonial trade. The worsted coating branch shows no signs of improvement.

The Governor-General of Broussa intends, says the *Levant Herald*, to form Chambers of Commerce in the different districts of this province. One such Chamber has been opened at Broussa.

Odds and Ends.

According to the *Journal de la Chambre de Commerce de Constantinople*, the silk section of the Agricultural Society of Moscow has offered *a prize* of 500 roubles for the best work on the *anatomy* and *embryology* of the *silk-worm*. Works on this question must be sent in not later than 1st January, 1892.

A Russian Journal has recently published interesting details of the traffic on the Central Asiatic Railway. The total merchandise carried has exceeded 20 millions pouds, or about 350,000 tons. The most remarkable increase has been in cotton—in 1887, 900,000, and in 1889, 1,776,000 pouds were conveyed by the railway.

A telegram from Uzun Ada reports that more than a quarter of a million pouds of cotton are now lying on the wharves of that port, while the railway (the Transcaspian) is bringing up some 20,000 pouds daily. This railway is a constantly increasing success, the receipts for the first five months of this year having been larger by half a million roubles than those of the corresponding months of last year.

According to the Italian *Bolletino delle Finance*, the Government of the State of Rio de Janeiro has decided to grant to all new establishments of spinning and weaving, which shall be formed in that State, a gratuitous concession of land for building mills, and is, moreover, endeavouring to obtain for them, from the central government, the free importation of all such machines, utensils, materials, tools, &c., as are necessary to carry on these industries. The municipality of the capital of that State has also undertaken to exempt from taxation, for the next ten years, all industrial establishments, of whatever nature, which shall be formed in the town.

The following is a French method of testing linen fabrics to find out if there is a mixture of jute in them:—Put a little solution of chloride of lime into a saucer, and lay in it, for four or five minutes, the yarn or cloth to be examined, then squeeze out the solution and put the fabric into a solution of ordinary hydrochlorate acid, and, after a few moments, take out and wash in plenty of water. Then apply a drop of ammonia to the fabric, and, in case there is a mixture of jute, a slightly violet red colour is immediately imparted. Flax and hemp become slightly brown. The red colouration, however, does not remain long, and the proportion of the jute mixture can only be roughly shown.

An attempt is being made by some Devonshire ladies to revive the lace industry of that county. Some of these ladies made two pilgrimages to Devonshire to perfect themselves in the art of pillow-lacemaking, and are teaching the lacemakers to copy fine old Flemish and Italian patterns. It was suggested that the extreme fineness of the Honiton lace, making its production so slow and laborious, and its price so high, as well as the poor patterns used by the lacemakers, were the cause of the decline in the demand for Devonshire lace. The lace-working ladies are, therefore, attempting to utilize the knowledge of the handicraft to be found in Devonshire in working better patterns, suitable for coarser thread. An emporium for the sale of the villagers' work has been opened in Princess Street, Hanover Square.

An extraordinary piece of Japanese weaving, says a contemporary, which is now at the Exhibition in Tokio, will shortly find its way to London, where it will be shown to the public by the owner, probably in Bond Street. It is known as *tsuzure-ori*, or pierced weaving. It is of great size, and the design is equestrian archery, an old-world accomplishment in Japan, and one which is frequently used for purposes of illustration and design by Japanese artists. The price asked for it was $10,000, or about £1,700. The distinctive feature of this kind of weaving is that the whole margin of the design is perforated like the joining of postage-stamps, so that, when the whole piece is held up to the light, the design of the artist seems to be suspended in the body of the stuff. In Japan, this kind of weaving has been regarded as a *tour de force* of the artist, and it is believed that the piece, which will soon reach this country, is the largest and finest ever produced.

In almost all the principal capitals and towns of Western Europe, there are, says the *Nouveau Temps*, large commercial museums, very well organised, with a view to making known what are the raw or manufactured products of such and such a country. These museums exercise a wide influence over the development of trade and industry. In Germany, nearly two million marks are annually expended in order to make the collections of museums of this kind, which exist in London, Vienna, Amsterdam, Stockholm, Zurich, Bremen, Rome, and in several other towns, as complete and perfect as possible. The Russian Ministry of Finance has, for some time past, recognised the importance of such establishments in the principal commercial centres. In 1888, a commission was appointed by it to examine the system of organisation of exhibitions of this nature. This commission, having now completed its task, the Ministry proposes to establish, in several European towns, museum exhibitions, similar to those referred to above. The question is being discussed of commencing to found them at Berlin, Paris, London, Hamburg, Naples, Stockholm, Constantinople, Teheran, and Tokio, near the Consulate-Generals. Each museum will be furnished with books containing statistical and commercial information concerning Russia, and it is proposed to appropriate a sum of 50,000 roubles for the expenses of establishing each of these museums.

CURTAIN.

DRESS GOODS

CURTAIN.

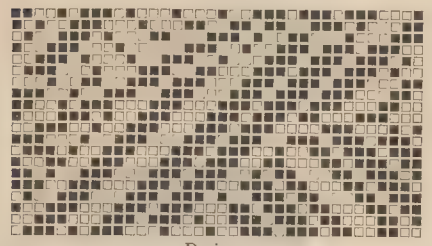
FASHIONABLE DESIGNS.

* * * * * A Supplement, containing Woven Specimens of the Designs given on this page, is presented each month to those of our Subscribers who manufacture Cloth for Ladies' and Gentlemen's wear.

Ours was the first Journal in this country to give woven samples of various descriptions of fabrics regularly each month, and since we commenced this feature, some years ago, it has, to some extent, been adopted by others. In matters connected with every branch of designing, we stand ahead of all other Journals.

Mantle or Costume Cloths.

No. 651.



Design.

Warp :—23 skeins woollen. Weft :—14 skeins woollen.

1,792 ends in warp; 32 ends per inch; 7's reed, 4 ends in a reed; 32 picks per inch; 64 inches wide in loom; 56 inches wide when finished. Weight 12½ ozs.

No. 652.

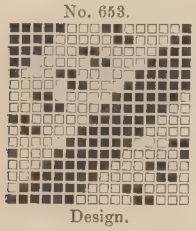
Design.

1,280 ends in warp: 20 ends per inch; 10's reed, 2 in a reed; 64 inches wide in loom; 56 inches wide when finished. Weight 9½ ozs.

Warp :—16 skeins woollen.
Weft :—18 „ „

Overcoating.

No. 653.



Design.

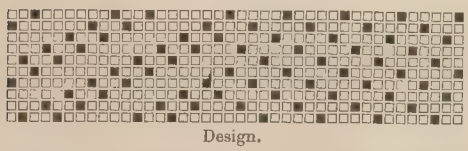
1,660 ends in warp; 26 ends per inch; 6½'s reed, 4 ends in a reed; 24 picks per inch; 64 inches wide in loom; 56 inches wide when finished. Weight 28 ozs.

Warp :—2/16 skeins woollen, Black.

Weft :—2/14 skeins woollen Twist.

Worsted Trousering.

No. 654.



Design.

Draft.

Pegging Plan.

Warp :—40 ends Blue, 2/48's worsted.
17 „ Black, „
6 „ Twist, „
17 „ Black, „

80 ends in pattern.

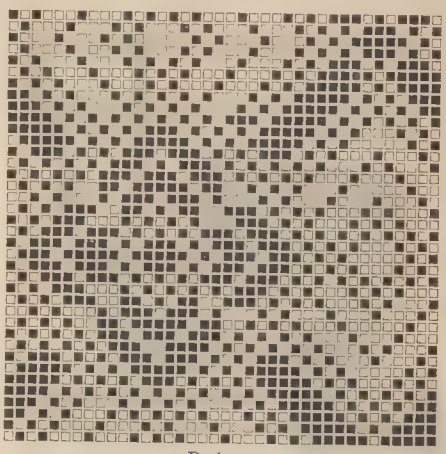
Weft :—9 skeins, all Black.

4,700 ends in warp; 74 ends per inch; 8½'s reed, 8 ends in a reed; 32 picks per inch; 63¼ inches wide in loom; 56 inches wide when finished. Weight 20 ozs

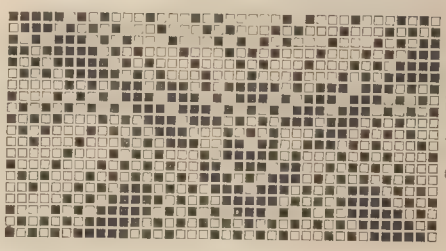
Cotton Dress Goods.

The following design is for cotton dress goods, and should be woven as follows :—Warp and weft 2/36's, 45's sett, 50 picks per inch. In the pegging plan lift □.

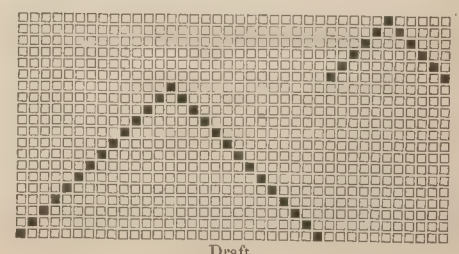
No. 655.



Design.



Pegging Plan.



Draft.

MACHINERY, &c.

Patent Waste Picker and Thread Extractor.

There has long been wanting in this country a machine for picking hard ends or threads from the clearer or crow waste, made upon the mule, ring, or throstle spinning frames. Such machines have for years been in use in the United States of America, much to the advantage of users of them. The slow process of hand picking, as generally carried on, is very expensive, and, at the best, unsatisfactory. A cheaper and more effective mode of picking this kind of waste will, therefore, we are sure, be heartily welcomed by those engaged in using spinning machinery, and a more efficient apparatus cannot be employed than that now being made by the firm of Mr. S. Brooks, Union Iron Works, West Gorton, Manchester, who have secured the sole right of making it, in this and several other countries, from the owners of the patent rights—the Kitson Machine Co.—who have placed the machines in many of the largest textile mills in the United States of America. A brief description of the apparatus will be interesting to our readers, and, from the illustrations, a general outline of its advantages can be gleaned. Fig. 1 shows the thread collecting beaters and shaft before working, and Fig. 2, their condition after working, with the threads, &c., collected on the same. Fig. 3 shows the condenser attached, and also the mechanism

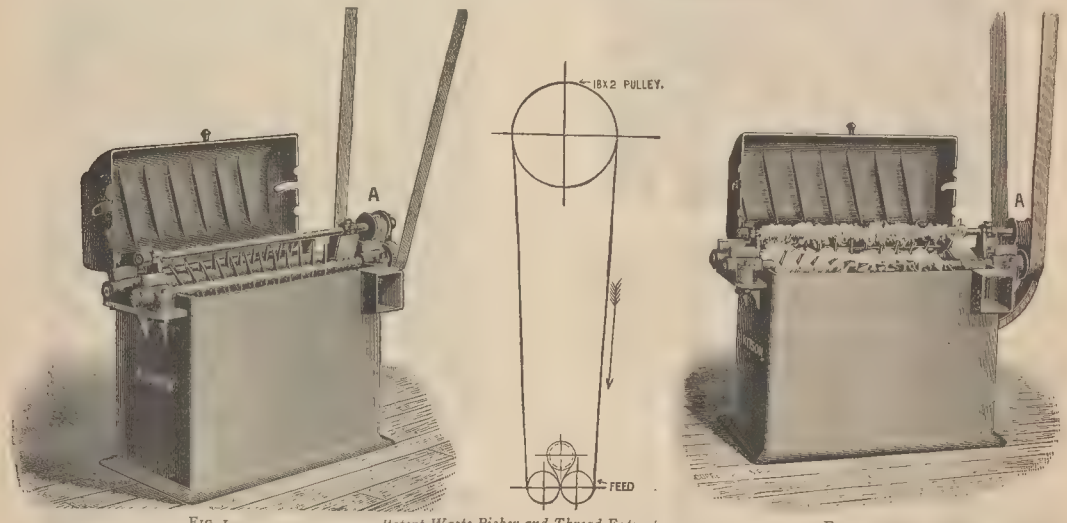


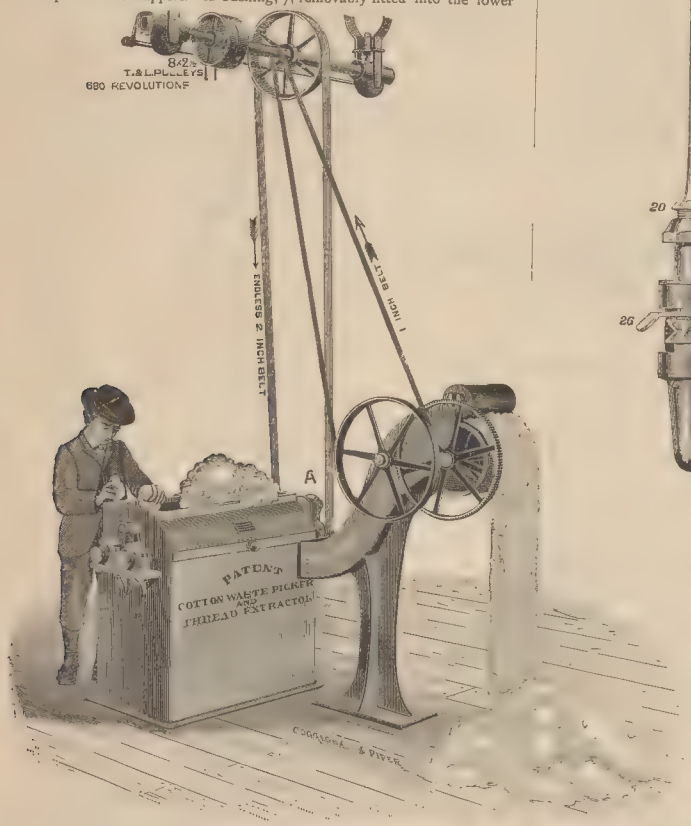
FIG. 1. *Patent Waste Picker and Thread Extractor.* FIG. 2.

complete, with counter shaft or top driving, as sold with the machine. The apparatus is built entirely of metal, the base or bottom part being one casting, and the top or lid being another. The beaters are solid steel castings in one piece, spiral in form, and the arms of such a shape as to give great strength. By this means, a strong beater is obtained, of small diameter between the arms, as the smaller the diameter, the better it is for extracting the shorter threads. With this point in view, a thread-extracting shaft, of still smaller diameter, is used near the periphery of the beaters, so that, in its revolutions, it whips up and collects shorter threads than the beaters themselves retain. The condensing attachment, shown in Fig. 3, is made in one main casting, cored out and finished smooth inside, with screen press roller, &c., and is driven by an inch belt from the bare shaft of countershaft driving the extractor; it collects and condenses the soft stock or cotton, which has been freed from threads, and delivers the same automatically into a basket or other receptacle placed to receive it. After having the hard ends extracted, the waste can then be mixed with raw unworked cotton, and passed through the various machines. The machine has the great advantages of picking out more threads than can be accomplished by hand, at a great saving in cost, and it opens out the cotton into the best possible condition for the mixing process. With a new form of steel grid under the beaters, blowing-room waste and floor sweepings can be cleaned, as well as threads extracted from spinners waste, the machine thus being adapted to the necessities of large and small mills alike. The apparatus only requires a floor space of 4 ft. 3 in. × 5 ft. A young workhand only is required to feed the waste into the machine through a hole in the lid. The power needed to run the machine is very little. Such are the advantages of the extractor that we are sure only a short time will elapse before the system of hand picking will be done away with and this type of apparatus substituted, as the cost, by its use, of waste picking and thread extracting is little more than one-twentieth of that of hand work. Mr. S. Brooks will furnish full particulars of cost, &c., on application, and the machine can be seen in operation at his works.

Bates' Spindle Support.

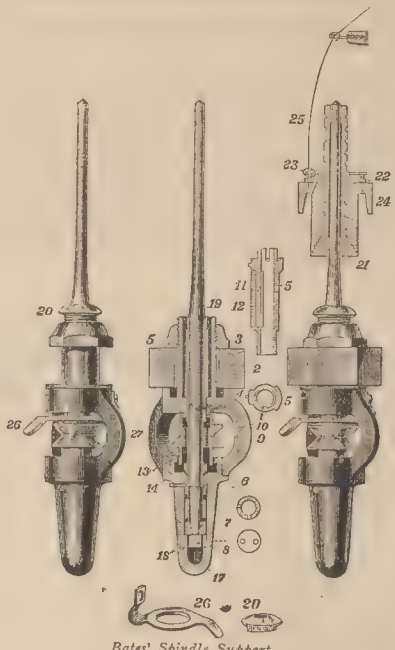
A spindle support, the inventors of which have been awarded the Elliott Cresson Medal, is being at present made in the United States, where it is meeting with much favour. Its purpose is to furnish a better support in which spinning spindles revolve, and, whilst supporting the spindle, so as to diminish and avoid the inaccuracies in the rotation due to the springing from unequal tension of the driving bands, to also furnish more durable wearing surfaces, easily and cheaply replaced when worn, and to provide an efficient means of constant lubrication and exclusion of foreign substances from the wearing surfaces. In addition to these features, the bearings, by reason of their construction, require less framing to support them, and are entirely self contained, and hold their several parts in correct relative position to each other, irrespective of any changes which may occur in the shape of the supporting frame of the machine. The functions of spinning-spindles are two-fold. They twist a filament or sliver of roving or carded cotton, which has been stretched out but not yet twisted, and wind it upon a tube placed upon the spindle, forming what is known as a cop. In the spinning of yarn, as practised in olden times in every household, the spindle revolved with the flyer or frame, bearing hooks, over one of which the yarn passed to the spool on the spindle, turned with a slightly greater velocity, and this difference produced the winding effect. In the ordinary spinning wheel, the spindle was horizontal, and was supported in bearings at each end. The speed attainable by foot-power was limited, and never brought out any test of the durability and capacity for work which developed in manufactures as conducted by water and steam power. In machine spinning, on the other hand, the spindles are vertical or nearly so. Power spinning machines may be classified as follows:—Throstle spinning, which resembles the method of the spinning wheel, using a flyer and bobbin; mule spinning, in which a certain length of sliver is paid out by rollers, and stretched and spun, and then wound upon the bobbins; and ring spinning, in which a spindle, revolving rapidly, turns a bobbin with it, inside a ring having a rim or lip, around which a small loop of metal, called a traveller, turns and guides the yarn, as it is twisted, from a sliver of roving, which is steadily stretched and paid out by a series of rollers in the upper part of the machine. The frictional resistance of the traveller upon the ring causes it to turn more slowly than the spindle and bobbin, and, as a consequence, the yarn winds on the bobbin. The rate of winding is regulated by the weight or size of the traveller. The ring and traveller have a slow up and down motion during this operation, which causes the yarn to wind evenly on the bobbin. The spindle and bobbin must be concentric with the ring, or else a tightening and loosening effect is produced at every revolution, which prevents the equal twisting of the yarn and the uniform winding of the cop. The practice which has prevailed, in making and supporting machine spinning spindles, has been to rest the lower end in a step set in a rail, and, with a journal above, fitting through another rail, known as a bolster rail; rotary motion is imparted to the spindle by a grooved pulley or whirl, turned by an endless band. In ring spinning frames, the rings are in another rail, which works slowly up and down in suitable guides, so as to wind the yarn evenly in the cops. It is obvious that any warping or springing of either of the rails must impair the alignment of the bearings of the spindles, and such impairment of position of the bearings increases the friction and retards the motion, and causes both a diminished quantity and a poorer quality of product. Such bearings are exposed to dust, and require frequent lubrication. The invention is designed to avoid the possibility of such defects and, as hereinbefore stated, to secure perfect cleanliness and automatic lubrication, besides facility of adjustment and repair. The Bates spindle support consists of an upper section, 1, which fits from below

through an opening in the single rail, 2, of the machine frame, resting with a shoulder against the under side of the rail, being drawn up and held in position by a nut, 3, upon the upper part. An oil receptacle, 4, is formed around the central portion of the upper part of the bearing within the shoulder, which receives an absorbent packing, and is in fluid communication with an oil-space in the central cavity, containing the upper bush or bearing, 5. A lower section, 6, is screwed into the bottom of the upper section, containing the lower bush or bearing, 7, and the bottom or end-bearing, 8, and an oil receptacle. In the upper section, 1, which is bored out concentrically with the screw and shoulder already referred to, is inserted the upper bushing or sleeve, 5, extending downwardly into a chamber, 10, formed in the upper side of the whirl, 9. A steel plate, 11, is inserted in the bushing, 5, on the side receiving the draft of the driving-band, with a wooden strip, 12, laid under it. The whirl, 9, has apertures, 13, made through it, reaching from the upper cavity, 10, into the lower cavity, through which oil can descend, but cannot be whirled off by reason of the lower rim, 14, of the whirl extending into a chamber formed in the lower part of the support. A bushing, 7, removably fitted into the lower



Patent Waste Picker and Thread Extractor. FIG. 3.

part of the support, serves to centre the lower end, and a hardened steel plate, 8, beneath the spindle supports the weight. The bushings, 5 and 7, which form the bearings, are not made with continuous outer surfaces to fit in the casing portions of the support, but are fluted or grooved so as to provide oil channels, 15 and 16, and chambers between the bushing and the casings. Below the hardened steel bearing, 8, there is a cavity, 17, into which any foreign substances in the oil can subside without injury to the bearing. A cap, 20, fitted loosely around the spindle, 19, at the top of the bearing, 1, serves to exclude dust, and is easily raised by the spout of the oiler. An oil chamber, 4, is formed around the bearing, which, being filled with an absorbent, saturated with oil, insures continuous lubrication for a long time. The portion of the bearing surrounding the whirl is formed with curved pillars and intervening open spaces, so as to permit easy access to the whirl for the driving band, and to afford opportunity for inspection. An elastic plate of metal, 26, secured by a screw to the upper part of the bearing at the rear, and extending across the upper surface of the whirl, with a projecting ear at the front, acts as a brake when pressed against the whirl, so that the motion of any spindle can be arrested without affecting that of any other. It will be seen, upon inspection, that the spindle is supported through a large portion of its length, down to the portion which the driving band strains upon the whirl, and cannot therefore be sprung or vibrated by the band. The oil is guided steadily from the top to the bottom of the bearing, as the oil chambers are sufficient in size to retain oil for several weeks running. As a matter of fact, these spindles have been run for six weeks at full speed with only one oiling, as a test, lagging only during the last week. It is found to be safe practice to oil them once per fortnight. Ordinary spindles require oiling at least every two days, usually daily, and even oftener. The bushings in the upper and lower parts of the bearings are easily removed and replaced, and being finished with their internal and external surfaces concentric, they cannot be



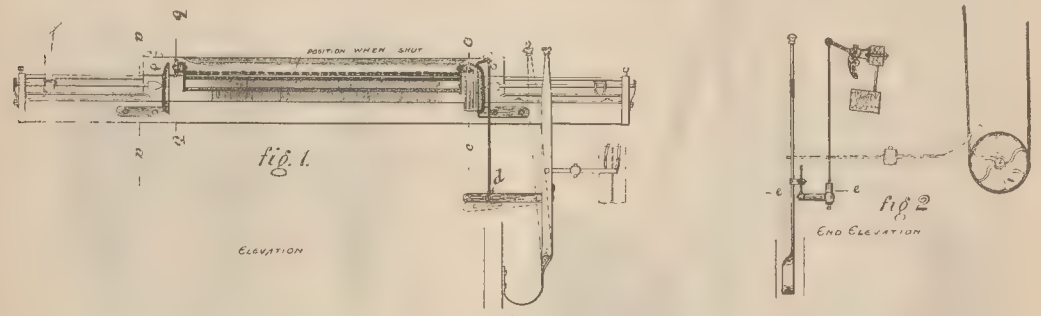
Bates' Spindle Support.

wrongly adjusted. From their form, they are cheaply made accurately interchangeable, so that, once fitted with these bearings, a spinning frame can, at low cost, be kept in best efficiency for an unlimited time. When once adjusted concentrically with the rings of the spinning frame, all parts, except the upper shell and nut, may be removed without impairing the adjustment, and the bearing may be replaced without interrupting the work of contiguous spindles. The spindle is so well supported in these bearings as to be incapable of vibration, and once set true with the ring in which it works, it continues to work true. The speed to which these spindles can be run without heating is far beyond the limit imposed by the properties of the staple to be spun. This, it seems, leaves nothing further to be desired in respect of speed. All portions of this spindle support are made to fit concentrically, and exact alignment is thus enforced. The finishing of the parts is entirely within the capacity of turret lathes, they can, therefore, be made at a low cost, and the parts subject to wear, to wit, the bushings, involve very little material, and are easily fitted or finished at slight cost. The Sub-committee of the committee on science and the arts, constituted by the Franklin Institute, of the State of Pennsylvania, U.S.A., to whom the examination of this appliance was referred, state that they have examined many other spindle supports and spindles, and have found nothing comparable with the construction exhibited in the Bates' spindle. The proportions and combinations of its several parts are so well arranged that, in repeated trials, a spindle weighing about four ounces was kept running for a period of three weeks, or 180 hours, at 12,000 revolutions per minute, without heating the bearings, with no perceptible vibration, and with only the oil supplied at the outset. The examiners affirm that the invention appears to be simple and effective, of great durability, of easy adjustment, susceptible of renewal of all the wearing parts in each spindle, without the trouble of readjustment, and without involving any suspension of the work of other parts of the machine, and, for this reason, together with the high speed at which it can safely be run, the invention increases the capacity of the machinery to the limit imposed by the properties of the staple, and, furthermore, it secures such a uniform spinning and winding, by reason of its accuracy of motion, that the best possible quality of product

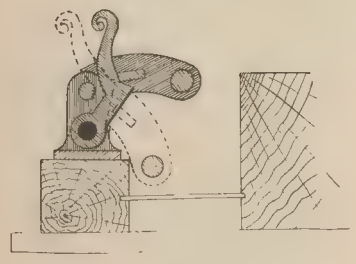
from the material results, as well as the greatest quantity in a given time, without requiring any additional labour. Thus the invention economises cost of production, and, since the advantages for such reduced cost for labour in proportion to the product, and such improvement in product, are followed by better weaving and better quality of cloth, with diminished cost, the invention may be fairly considered as a most valuable accession to the comfort of mankind in their second great want—*clothing*—food only taking precedence.

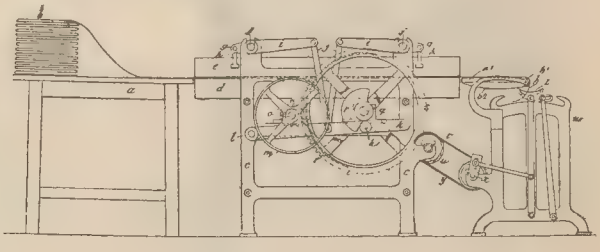
Tyler and Davies' Shuttle Guard.

From the frequency of accidents arising from shuttles flying from looms, manufacturers are gradually seeing the utility of providing themselves with preventatives of disasters arising from this cause. One of the latest appliances has been spoken of so highly by a number of factory inspectors, and also by those who now have them in use, that a description of the leading features of this guard will be acceptable to those engaged in weaving any kind of fabric. The inventors, Messrs. Tyler and Davies, claim that it is perfectly impossible (except from breakages) for the shuttle to fly, as it is guarded, the whole length of the reed space, by a double iron rail, and at each end by iron plates, curved inwards from the entrance to the shuttle box, so that, if the shuttle was in any way thrown out of its proper course, it would only hit the rail on one of the plates, and, in all probability, would be guided by them into the box. Figs. 1 and 2 give the front and end elevations of the apparatus, as applied to the lay and stop rod of the loom. The guard, when the loom is running, occupies the position shown in Fig. 1, in which *b c* are two small brackets, which hold the double rail by means of



Tyler and Davies' Shuttle Guard.





Tyler and Davies' Shuttle Guard.

Pressing Woollen Cloth.

a rod that joins the lever, *d*. The lower end of the lever, *d*, works in a slotted hinged bar, Fig. 1, working on one end of a stud, *e*, Fig. 2, so that the guard rails are kept in a constant position in relation to the reed, whilst the loom is working. The other end of the stud, *e*, is attached by a small arm to the stop rod, as seen in elevation at *e e* and in Fig. 2. When the loom is knocked off, the slotted bar, in which the lever, *d*, works, is depressed by the stop rod (see dotted lines, Fig. 1), and in its turn pulls down the lever, *d*, so causing the guard rail to be curved under the hand rail, and to be out of the way of the weaver when throwing in the shuttle or replacing broken ends. It will be seen that, by a similar process, the guard rail is again brought into position for work when the loom is started. Fig. 3 is a catch, which is fastened loosely on the bracket, *c*, which, when the guard is put in position, falls on the double rail, and prevents the guard from shutting, even though the loom is knocked off, thus, in fact, stopping the guard, acting automatically, and doing away with the drawback arising from most automatic guards, of the shuttle flying out *after* the loom is knocked off and the guard out of position, before the loom actually stops. Mr. A. Lewis, Inspector of Factories, speaking of the merits of the apparatus, writes:—"I am wishful to say a few words on the subject of safeguards, which cannot but be at all times present to the mind of an inspector who, by the nature of his daily duties, is constantly being impressed with its paramount importance. As a result of the prominence given to looms, I have had my attention called to an improved guard, recently invented by Messrs. Tyler and Co., Maesllyn Welsh Cloth and Woollen Mills, Llandyssil. It consists of two bars or rods of iron fixed at a suitable distance apart, extending horizontally along the slay, and covering the shuttle board at all points in a plane, parallel to that of the travel of the shuttle. It is hinged at each end, on the slay cap, and is arranged to rise and fall automatically on the hinges, with the stopping and starting of the loom. At the end of the shuttle board is a guide-plate, curved inwards, so that, in the event of the shuttle striking the plate, it is thereby guided into the shuttle box. Upon a recent visit to the Maesllyn factory, I saw the guard in position, and, upon inquiry of the weavers, I ascertained that, during the few months it had been in use, it had given every possible satisfaction, having prevented the shuttle from flying even once. According to the testimony of the weavers and foreman, this guard is a decided improvement upon any other they have yet seen, and is unhesitatingly pronounced by them to be a perfect success." The appliance can be attached to any kind of loom, without interfering with the working parts, and may be seen at work at the Laycock Mills, Bradford; or at the Yorkshire College, Leeds, and all particulars can be had of Messrs. Tyler and Co., Llandyssil, South Wales.

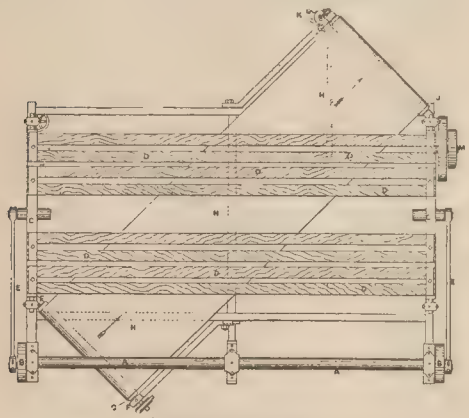
Machinery for Pressing Woollen, and Mixed Woven, or Felted, Fabrics.

The object of this invention is to facilitate the pressing and folding of woollen, and mixed woven, or felted, fabrics, to which such goods are subjected before leaving the hands of the dyer, and also to dispense with the necessity and expense of press-papers, and the skilled labour, as ordinarily required, for the insertion and withdrawal of the same, before and after pressing. For this purpose, a folding or plaiting machine, of ordinary construction, is employed, in combination with a pressing apparatus, comprising a fixed pressing bed of proper width, and, preferably, about seven feet long, mounted in suitable framework, and above this, a corresponding part capable of being raised and lowered as referred to below. Both these parts are strongly ribbed and hollow, and heated by steam, or otherwise, through suitable connections, their meeting surfaces being planed true. This framework extends above the upper pressing part, and carries, near each end, in suitable bearings, a rocking or fulcrum shaft, on which are fixed short levers, between the ends of which and the said upper part of the press are connecting links. On the contrary sides of these rocking shafts are longer levers, to the ends of which are other links, connected to another lever, having its fulcrum in the framework, and actuated in one direction so as to raise the said upper part, after pressing the fabric under treatment. The latter is next drawn forward, to the extent of the pressed portion, by the action of the folding machine, and folded thereby, and, at the same time, another portion of the piece is placed into the press. The action of the folding machine is now arrested for the time being, and also the action of the system of levers on the upper part of the press, which is at liberty, and descends, to effect another pressing. It will thus be seen that the pressure imparted to the fabric is by the dead weight alone of such upper part which, for many classes of goods, is

sufficient for the required finish, but, when desired, more weight can be added. At the feeding end of the pressing apparatus, and about equal in length thereto, is a table, at the extreme end of which is placed the fabric to be operated upon, and along which it passes to the press, guided by the operator, the length of the table enabling him to see that the fabric is straight before entering the press. A short wrapper is sewn to the leading end of the fabric, by which it is drawn by hand through the press, in the first instance, and placed in the folding machine, and, in order to render the apparatus self-acting, there are placed upon the main driving shaft of the apparatus, the rotation of which is continuous during the pressing and folding of a piece of fabric, a drum and a cam. A certain portion of the periphery of the former has fixed thereon a thickness of leather, india-rubber, or other suitable material, by which, on coming into contact with another pulley in connection with the driving mechanism of the folding machine, it propels the same frictionally, until it has folded the pressed portion of the fabric under treatment, and, as previously referred to, drawn another portion of the fabric into the press, which, at the time, is kept open for the purpose by the action of the cam on the before-named system of levers. The operations of pressing and folding thus take place alternately, till the whole piece is gathered into the folding machine.

Witney Cloth and Apparatus for Producing such Cloth.

Fig. 1 is a plan of witney machine with improvements applied. In order to carry out this improvement, the ordinary witney machine is made of greater width than usual, and upon it is mounted a shaft, A. Upon this shaft, at each end, is a cranked pulley or eccentric, B, connected to the box, C (in which are fixed the witneying bars, D) by connecting rods, E, for giving the necessary witneying motion to the witneying bars, D. The cranked pulleys, B, are driven by a belt from the main or other driving shaft. Upon the underside of the witneying bars, D, is attached india-rubber and cotton cord, for putting the required witney finish upon the cloth or other fabric. At one corner of the machine are suitable standards or



Witney Cloth Machine.

bearings, F, carrying a brake and feed roller, G, covered with cards, to give the necessary tension to the fabric passing through the machine. The cloth or other fabric, H, passes over this feed roller, diagonally, across the machine, and over a second or drawing roller, J, also covered with cards. Motion is given to this drawing roller by means of worms, K, and worm wheels, L, driven from the main or other driving shaft, M. Upon motion being imparted to the cranked pulleys, they give the necessary motion to the witneying bars, D, by means of the connecting rods, E, which bars operate upon the cloth diagonally, whilst passing through the machine in a stretched state, thus causing the witney finish upon the cloth to be diagonal instead of straight as heretofore.

A New Smoke Consuming Apparatus.

Messrs. Hodgkinson and Sons, Hilton Mills, have in their mills a clever contrivance patented by Mr. Wood, manager of the mills, for the consumption of smoke. The apparatus is automatic in its action, and is not dependent on the will of the fireman. The agencies employed are air, petroleum, and steam, and these having to pass through a tube 22 inches long, protruding into the flue, become super-heated, and form a combustible gas, which, coming in contact with the flames over the fire, ignites and completely consumes the carbon or smoke as it arises from the fuel. The apparatus is set in motion on the opening of the furnace door, but, in order that there may be no waste of material, it is so arranged that, as soon as the smoke is consumed, the apparatus can be shut off. Under ordinary circumstances, black smoke issues from a factory chimney for a number of minutes after the fire has been made up, but, by means of the invention under notice, the smoke is reduced to a thin vapour. At Hilton Mills, where two boilers have to supply the power for bleaching, sizing, and finishing cloth, in addition to the manufacture of goods, the boilers have been found to work very well, notwithstanding that they are heavily fired; there is increased power without any increase in the cost of fuel, and the flues do not require to be cleaned out so often. The cost of fixing the apparatus is exceedingly low. It does not require any power to work it, and does not necessitate the abolition of hand firing. It can be applied to stationary, locomotive, and marine engines.

Personal and Trade Notes.

The will of the late Sir John Preston, linen manufacturer and spinner, Belfast, has been proved, the personalty being under £160,000.

Mr. E. Collinge, of the firm of Messrs. James Collinge and Sons, cotton spinners and manufacturers, Oldham, died at Bowness on the 21st ultimo.

The Indian Office, it is stated, has just received some new specimens of Indian fibres. They will be divided between the Chambers of Commerce at Manchester and Dundee, and the Royal Gardens at Kew and Edinburgh.

The large crape and silk factory of Messrs. Grout and Co., Norwich, has just been closed. It is said that, in the future, the work of the company will be carried on at the Great Yarmouth establishment of the firm.

The Nab Lane Manufacturing Co., Limited, has been registered, with a capital of £5,000, in 40 shares of £125 each, to carry on business as spinners and manufacturers of cotton, yarn, cloth, and other fibrous materials.

The firm of worsted spinners, carried on by Mr. J. M. Howson, of Prospect Mill, Wibsey, Bradford, and of Albert Mills, Halifax, has been registered as a Limited Liability Company, with a capital of £50,000 in £10 shares.

Mr. P. Rothwell Arrowsmith, J.P., and at one time mayor of Bolton, died at his residence, Ellerslea, Dalston, near Carlisle, on the 24th ultimo. The deceased was, up to the time of his death, a member of a firm of cotton spinners and manufacturers at Bolton.

The Right Hon. C. T. Ritchie, President of the Local Government Board, is a partner in the firm of W. Ritchie and Son, jute manufacturers of Stratford. In his earlier years, he was head book-keeper in the establishment. He used to be fond of amusing himself by solving puzzles and cipher correspondence.

The Newport Spinning and Weaving Company, Limited, has been registered to acquire the cotton mill, known as Victoria Mill, Cloughfold, Lancashire, and to carry on the business of spinning, weaving, and dealing in cotton yarn and other fibrous products. The capital is £62,000, in £7 10s. shares.

Mr. J. H. Stott, maker of warping, winding, and reeling machinery of all kinds, whose works were in Baron Street, Rochdale, has removed, in consequence of his rapidly increasing business, to larger and more commodious premises. All communications must be addressed to Wardleworth Works, Whitworth Road, Rochdale.

The Rossendale Industrial Co. of Bacup, placed the order for repairing, strengthening, solidifying, and securing their steam engine foundations at their Irwell Mills, with Messrs. Fox and Williams of Manchester. The work was most successfully carried out during the week end, under the superintendence of Mr. Williams, with their patent fusible metallic cement.

News comes from Baltimore that a season of great activity and prosperity throughout the Southern States of the American Union is expected as the result of the abundant cotton crop, combined with the relatively high prices of the fibre, whilst advices from the Western and North-Western States are far from satisfactory, disastrous crop failures seeming to be the rule.

Mr. Joseph Law, mule spinner, and a member of the Chadderton district of the Oldham Province, residing at Busk Street, Oldham, has been appointed sub-factory inspector of a district in Glasgow. This is the third appointment of the kind made from gentlemen of the Oldham neighbourhood. The others were Mr. A. Platt, who is now in the Burnley district, and Mr. Dawson of Hollinwood.

The large firm, of old standing, of Dolfuss, Mieg and Co. of Mulhouse, makers of cotton printed goods, cotton and woollen dress stuffs, etc., has been converted into a limited liability company, by the mediation of the two banking firms of Banque de Mulhouse and Von Speyr and Co., of Basel. The capital of the company amounts to ten million francs in shares, and six million in debentures.

A new edition of the catalogue of the Pulsometer Engineering Co., Limited, Nine Elms Iron Works, London, S.W., has just been issued, in which are given full particulars, and descriptions with illustrations, of pumping machinery for every kind of service, and also of machinery for filtering and other purposes. Those requiring mechanisms of this class would do well to ask for a copy of the catalogue.

The firm of Messrs. Thomas Emmott and Sons, Limited, has been registered, with a capital of £175,000 in £100 shares, to acquire, and to continue and develop, the business carried on under the title of Thomas Emmott and Sons, at Vale Mill, Clegg Street Mill, Green Street Mill, Albion Mill, and Diamond Mill, in Oldham, and at 38, George Street, Manchester, cotton spinners, manufacturers and merchants.

A line of railway to connect Algeria with Senegal and the Gaboon-Congo, and thus open out the Soudan and the part of Africa watered by the Niger, and connect that district with the Mediterranean, has been sanctioned by the French Government. The cost of laying down this line is estimated at £3,500 per mile, but the vast amount of commerce anticipated by the enterprise is expected to be well worthy the venture. Another line, 4,200 miles in length, is to be made by the Russians, from the west of the river Oural to the Russian port of Vladivostock on the sea of Japan.

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Bleaching. H. Thies and E. Herzig, London. 18th Aug. 12,950
Box for loose boss rollers for spinning mules. K. Seville, Manchester. 25th Aug. 13,350
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Patents Sealed.

11,124	11,666	11,820	11,961	11,973	12,757	4,885	5,009
6,344	9,439	10,815	11,345	12,212	12,246	12,265	12,466
12,534	6,110	6,170	6,870	7,029	9,904	11,098	11,452
11,653	11,837	11,918	12,585	12,587	12,652	12,866	14,008
1,968	5,285	10,213	11,395	12,987	13,082	13,130	13,346
13,558							

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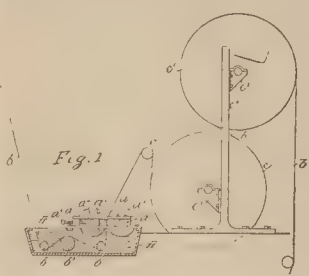
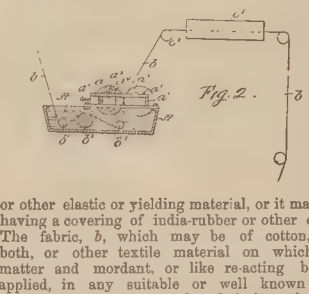
Colouring Matters in Fabrics.

This invention relates to a novel method by which a lake or colour, fixed in a textile fabric, may be developed or varied in shade to produce the shade of colour desired. In colour printing, as now commonly practised, the fabric, either cotton or wool, or mixture of both, in the form of a web, is subjected to the following chief operations or steps, viz.:—The colouring matter mixed with a mordant, or like mixture of re-acting bodies, which constitutes the colour or dye of the printer, is printed upon, or applied to, the fabric, by means of suitable printing machinery, such as rollers; the colour or dye is then fixed or formed into a lake in the cloth, by the ordinary operations, such as drying or steaming, and is then developed, or brought to the required shade, by passing the printed fabric through a hot bath containing the re-agent or developing substance, which, for example, may be bichromate of potash, tartar emetic, or other suitable or well known re-agent. As the printed fabric passes through the hot bath referred to, the chemical re-action between the lake and the developing re-agent is effected by the heat of the bath, which is maintained at the temperature suitable to effect the chemical re-action, which temperature may be varied according to the nature of the re-agent or fabric, that is, the lake or colour fixed in the fabric is chemically re-acted upon, by the bichromate or other re-agent, to produce the desired shade of colour. It has been found in practice that a portion of the lake or colour printed upon the fabric by the printing rollers, together with foreign matters on the cloth, such as starch, &c., applied in the prior preparations of the cloth, is mechanically detached or dissolved by the agitation of the liquid of the hot bath referred to, and also by the passage of the fabric through the apparatus, so that the detached or dissolved colour or lake and foreign matters not only contaminate the said bath and render it worthless after little use, and before the bichromate or other re-agent has been entirely or wholly utilized, but also stain or otherwise disfigure the pattern printed upon the fabric. This is especially true when a portion of the fabric is not printed upon, so as to leave a white ground or figure in the design, and, in this case, the white portion not only becomes discoloured or injured by the contaminated solution of the bath, but also by the detached or dissolved lake or colour running down over the fabric, as it is passed through the portion of the apparatus above the vat containing contaminated re-agent. It has been discovered by experiment that the deleterous effects obtained in the developing part or process of colour printing, as now commonly practised and above referred to, may be obviated by effecting the chemical re-action between the developing re-agent and the colour or lake in the fabric, after the printed fabric has passed out of, and away from, the bath of the developing re-agent. In accordance with the invention, therefore, the bath of developing re-agent is maintained at a suitable temperature below the point necessary to effect the desired chemical re-action (it being preferably cold), and the said chemical re-action between the re-agent and colour or lake in the fabric is effected outside the said bath, by passing the fabric over, or about, hot cylinders, or in other well known manner of heating, such as by passing it through a steam chest. Fig. 1 shows, in section, a sufficient portion of one form of apparatus, with which to practise the invention, to enable it to be understood, the vat containing the re-agent being in section, and Fig. 2, a modification to be referred to. The vat, A, containing a solution, A^1, of bichromate, tartar-emetic, or other developing re-agent, supports a frame, a, in which is mounted bearings, a^1, a^2, of rolls, a^3, a^4, the bearing, a^1, being here shown as fixed or stationary, it being fastened as shown by bolts, a^5, and the bearing, a^2, being moveable in the frame, a, as shown, by means of adjusting screws, a^6, only one of which is shown, to adjust the position of the roll, a^4, with relation to the roll, a^3, for a purpose as will be described. The roll, a^3, will preferably be of brass or other suitable metal, and the roll, a^4, preferably of india rubber or other elastic or yielding material, or it may be a wooden or other roll, having a covering of india-rubber or other elastic or yielding material. The fabric, b, which may be of cotton, wool, or a mixture of both, or other textile material on which a mixture of colouring matter and mordant, or like re-acting body has been previously applied, in any suitable or well known manner, and then fixed or formed into a lake in the cloth by subsequent operations, such as steaming or drying, &c., is first passed under a roller, b^1, as shown in Figs 1 and 2, then over a roller, b^2, and under a third roller, b^3, and then between the squeezing rollers, a^3, a^4, by which the surplus liquid or solution, A^1, in the fabric is pressed out thereof, it dropping by gravity back into the vat A. The solution, A^1, containing the developing re-agent, such as bichromate of potash or soda, tartar-emetic, or other suitable re-agent, may be supplied to the vat, A, by a suitable pipe not shown. The solution, A^1, in the vat is maintained at any temperature suitable, but below the point or degree of heat necessary to effect the chemical re-action between it and the lake or colour fixed in the fabric, the solution being preferably admitted into the vat cold, whereby the colour or lake in the fabric is neither dissolved nor detached. The rollers, b^1, b^3, serve to bind the cloth upon the roller, b^2, technically known as the "stretcher" or "opener," by which the cloth is opened and freed from folds and scrimps. The roll, a^4, may be removed toward, or away from, the roll, a^3, to expel more or less of the solution containing the developing re-agent from the fabric, as the case requires, so that the proper amount of developing re-agent may be left in the fabric to effect the best or desired result. In practice, the fabric, b, is passed through the vat, A, in the form of a web, it being composed of a number of separate pieces sewed or otherwise secured together. After passing the squeezing rolls, a^3, a^4, the web of cloth, b, containing the colour or lake and solution of developing re-agent is heated to effect the chemical re-action between the colour or lake and the developing re-agent. As shewn in Fig. 1, the heat referred to is obtained by means of revolving cylinders, c, c^1, around about which the web, b, is passed, it being first passed, as shewn, over a roller, c^2, located substantially as shewn, to utilize the maximum amount of the heating surface of the cylinder, c. The cylinders, c, c^1, are shown as supported by a frame consisting of brackets, c^3, secured to standards, c^4, only one of which is shown, the said cylinder being preferably heated by steam admitted into them through a suitable inlet, not shown, as, for instance, a hollow journal, as usual with apparatus of this class. Instead of the steam cylinders, c, c^1, the necessary heat to effect the chemical





re-action may be obtained by means of a steam chest, c^3, see Fig. 2, provided with a steam inlet and outlet, not shown, or in other suitable or usual manner. By subjecting the printed fabric to the solution containing the developing re-agent maintained substantially cold, that is, below the temperature or point of re-action, the said fabric becomes saturated, padded, or impregnated, with the said developing solution, which, being substantially cold, neither dissolves nor detaches the colour or lake and foreign matter from the goods during their short immersion, so that the developing solution expressed from the fabric by the squeezing rolls returns to the vat, A, clear and uncontaminated with foreign colouring matter. It will thus be seen that the solution containing the developing re-agent may be entirely consumed or utilized, thus obviating delays necessary to replace the contaminated solution, and rendering the process continuous, whereby a greater quantity of work may be accomplished in a given time. Furthermore, the discolouring or staining of the white ground or figure of the fabric is also entirety obviated. The patentee does not desire to limit the invention to the use of rolls to free the surplus developing solution or re-agent from the fabric, as other devices may be employed, as, for instance, centrifugal machines, or the fabric may be allowed to drain before being heated, in which case, the cold, or substantially cold, developing liquid running down over the fabric would neither dissolve out nor detach any of the colour or dye from the fabric. In practice, the fabric is not entirely dried by the cylinders, c, c^1. The following is the process as applied in practice, viz.:—The colouring matter, mixed with tannic acid, is applied to the cloth by printing rollers, or in other suitable manner, preferably in the form of a design, and the cloth is then treated, as by steaming, to effect a chemical re-action between the colouring matter and the mordant, that is, the tannic acid, and form an insoluble precipitate or lake in the fibre. So far, this is the ordinary mode of procedure. The cloth is then passed through a bath containing antimony, and maintained below the degree necessary to effect the desired re-action between the colour or lake, and the re-agent, that is, the tannic acid and antimony. The cloth is then subjected to heat outside the bath, and the chemical re-action is thoroughly effected between the tannic acid and the antimony, whereby the shade of the colour or lake printed upon the cloth is developed to produce the desired shade and fixity of colour. In case the colouring matter requires oxidation to produce the desired shade, as, for instance, catechu, the colour is mixed with a mordant, acetate of chromium, and the mixture applied to the fabric, and a lake formed, as by drying or steaming. The colour is fixed in the cloth, but has not been oxidized or developed to bring it up to the required shade, and, in order to effect this result, the cloth is passed through a bath of oxidizing or developing re-agent, such as bichromate of potash, but maintained cold or substantially cold. The development of the colour or lake is then effected by the subsequent application of heat outside the bath.

New Patented Fabrics.

BLEACHING AND FIREPROOFING FABRICS.

This invention relates to an improved method of treating textile fabrics, such, for instance, as bagging, manufactured from jute butts and other fabrics, and consists in applying to the fabric a chemical solution, and then rolling or baling the fabric into bundles while yet damp with the solution, whereby the chemicals act upon the fabrics and bleach them. In carrying out the process, a solution is made consisting of suitable chemicals and water, say two to three pounds of the former to seven or eight pounds of the latter, and applied to the fabric, preferably, while the latter is on the calender. Any suitable chemical may be used, as, for instance, borax, soda, alum, chloride of sodium, and other chemicals that would have the desired effect. After the solution is applied, the fabrics are formed into bundles or rolls, while yet damp with the solution, and stored away in this damp condition, when a chemical action takes place in the mass, which effects the bleaching of the fabrics, and renders them whiter than they would be if the same solution were applied and the fabrics dried before being formed into bundles or rolled up. The bleaching of the fabrics is not the only result, but it also renders the fabrics fire-proof, and makes them softer and more pliable, and thus adds also to their value. As an example of a suitable solution per yard of the fabric, two and a half pounds of chloride of sodium, dissolved in seven and a half pounds of water, has been found to give good results. The invention is particularly applicable to the manufacture of bagging from jute butts, and it will be far superior to that heretofore produced from this article, in that it is lighter in colour, as well as much superior in appearance. By applying the solution while the goods are on the calender, it does not come in contact with the spinning and weaving machinery, which would cause them to rust, and by applying it while the goods are on the calender, and just before being rolled up, a very thorough and even distribution of the chemical through the goods is obtained. As before stated, the rolls are stored away as they come from the calender, and in a damp condition, produced by the application of the chemical, and the result is that a chemical action takes place in the tightly rolled goods, which very materially improves the colour of the article, and adds much to its value, but practically nothing to the cost of its production.

DYEING ANILINE BLACK.

An improved method of dyeing aniline black, which has been patented, consists in employing a mixture of the solution of the aniline salts, with a solution of such matters as coagulate immediately into an insoluble combination with the re-agents, especially with chromic metallic salts, usually employed for the oxydation of the aniline, and so carry along the aniline salt, and secure it on the staple. Such properties are shown by the so-called proteine compounds—albumen and caseïne, as well as their kindreds—the glutinous liquids, namely, glutine and chondrine. A 10% solution of glue is prepared by stirring and boiling, and 20% of aniline hydrochlorate is added. The mixture will become clear at once, and remain quite thin and flowing in a cold atmosphere. The matters to be dyed are now soaked in this solution, then they are either pressed or swung, and treated, either at once, or after a slight drying, with a solution of chromic acid, or its salts, and salts of the oxides of copper or iron, with or without addition of oxydizing materials, such as combinations of oxygen with chlorine and manganese, until the aniline black is fully developed. If caseïne is to be used as a coagulating body, a 5% solution of the same is made by boiling with aniline salt and free aniline prepared. When using albumen from blood or eggs, the operation of dissolving and soaking should naturally be performed in a cold atmosphere.

ORNAMENTING LACE BREADTHS AND EDGINGS.

Lace breadths or edgings are made in the usual way, with one edge plain, purled, scolloped, or vandyked, and the other edge formed with a pattern, having plain net, or clothwork, or a pattern, between the edges, each breadth or edging being connected to the next breadth or edging by lacing and draw threads. The breadths or edgings are arranged in a series of widths across the machine, and the series of widths are connected by other lacing and draw threads in such a way that when the piece of fabric has been dressed, and the series of widths separated, the edges of each series will form parallel lines. Each series is then passed over or under a pattern roller, cut, or otherwise formed, so that it will deposit, or press, a dye or stain on the plain net, clothwork, or patterned portion, between the edges of each breadth of edging of the series of widths, the pattern so produced varying according to the pattern of the roller employed and the colour of the dye or stain. The illustration shows portions of three breadths or edgings of lace, with the right edges, A, plain, or they may be formed with a purled, scolloped, or vandyked, edge. The reverse edges are formed with a pattern, B, of any suitable design,

having either plain net, or clothwork, C, between the edges, or a patterned net, or ground, may be formed between the edges. The breadths or edgings are arranged in a series of widths across the machine, and the whole of the adjacent edges are connected by lacing threads, D, and draw threads, E. In the drawing, only one lacing thread and one draw thread are shown, connecting the breadths or edgings, but when the patterned portion, B, forms a deep scolloped, vandyked, or other shaped, edge, then two or more lacing threads and draw threads are employed to hold out the patterned edge in such a way that, when the piece of fabric has been dressed, and the series of widths separated, the edges, A, of each series, will form parallel lines. Each series is then passed over or under a roller having the required pattern, cut or otherwise, formed upon it, so that it will deposit or press a dye, or stain, F, F, on the plain net, clothwork, or patterned net or ground, C, between the edges of each breadth or edging of the series of widths. The pattern, F, F, so produced, varies according to the pattern of roller, and the colours of the dyes or stains employed.

AN IMPROVED "PROOFED" FABRIC.

The object of this invention is to make a new or improved "proofed" fabric, more especially designed for the covering of cushions, seats, and backs, for railway carriages and similar uses, but it is, also, equally applicable to a great number and variety of other purposes. It is well known that horse hair has, for a long time, been made into a fabric known as "hair-cloth" and "hair-repp"—both plain black and coloured, which, from its great wear resisting properties has been used for seatings, and a variety of other purposes, but it has one great drawback, viz.:—that of admitting dust, vermin, &c., owing to the open nature of the fabric. The present improvement consists in "proofing" such fabric,

preferably on the underside, in any of the well known, or other suitable, methods of "proofing," including adhesive proofing or non-adhesive proofing. The work can be readily carried into practice by india-rubber goods manufacturers, or others conversant with the treatment of india-rubber and its manufacture into goods. Thus such proofed hair fabric, while retaining all the advantages and wear resisting properties of hair cloth, or other hair fabrics, is, by this invention, rendered waterproof and impervious to dust or vermin.

In the Finishing Room—Shearing.

In shearing a piece of cloth, there are so many little points to be dealt with and noticed that their number is almost legion. These, although they may seem trifling and unimportant, are tests of a good shearer. The operative should have his eyes upon the machine all the time it is running, and keep a constant watch for those little points of which he alone is aware, and which he finds it so hard to explain clearly to others. The shearer should place himself at the side of the shear near the clipper handle, since, there, he can see the whole surface of the cloth as it passes through the machine, and, as he is looking at it from the side, every little unevenness and imperfection may be at once detected. Very often, when the shear is beginning to get dull, the operative will notice spots here and there on the surface of the cloth which do not appear to be shorn down as close as the rest of the piece. To detect this common trouble, there is no better way than to look at the cloth, while running, in the manner above indicated. When such a state of affairs as this is discovered, the shear should be at once stopped and examined It does not do to allow it to go on till the next run, in hope that it will right itself. Once such places are allowed to form, it is no slight task to finish the piece perfectly afterwards. It is best, therefore, to remove the cause of trouble, whatever it may be, before proceeding any further in the process. In shearing, we must be careful not to have the blades set too high above the rest, as such a condition of affairs will be sure to injure the fabric in hand. If the listings are not just what they should be, they will, very likely, be cut and haggled in such a way as to make them far from an addition to the appearance of the cloth. For woollen and cassimeres, the carriage should be so set that, when all the notches have been dropped, there will be a slight tremble or faint jar on the cloth, caused by the revolver touching it lightly. This jar will not be noticeable when the piece is finished. But with worsteds, a different course should be pursued. It will not do to allow the revolver to touch the cloth, then, in the way above described, as it would be liable to seriously injure the threads as well as the strength of the fabric. When working on Cheviots and coarse woollen homespuns, we run through merely in order to cut off and remove any long fibres that may appear on the face. No nap is desired on such a finish, therefore, it is unnecessary to spend very much time on it at the shears. Still, we have always found that such goods are sure to look clearer and better if they are neatly back burled and then given a run or two on the face before they are pressed or rolled up for the market. When working on the velour finish, the raising brush should be set off. It is seen that, since it is required that the nap should lie straight, it will not do to disturb that which has already been obtained on the gig. Consequently, it will be found best not to allow the revolver to strike the cloth, as it may interfere with the evenness of the nap, and make it curly. It is not unlikely for it to happen that pieces of the same style, and even from the same warp, should differ considerably, at different times, in weight and in bulk, and hence the shearer must be careful to take these changes into consideration in his treatment of each. It is the best policy, therefore, to examine the goods while they are on the safe side,—that is, before they have been touched at all, and determine just what course it is best to adopt. It is easy enough to take off the nap which has not yet been removed, but impossible to replace that which has once been taken away. Do not try to hurry the work. Only gradually lower the blades until the notches have been counted off, and then finish up. On a face finish, give, at least, five or six runs to smooth the surface nicely, and add to the desirable appearance of the finished cloth. To this end, it will be found of advantage, on close finished goods, to remove the raising brush entirely on the last two runs. This, then, practically comprises the actual work required in shearing a piece of goods. Let us now look for awhile at a few of the difficulties which meet the shearer in his work, and which always call for some sort of a solution before the process may be considered a success. The first which comes to mind is known as uneven shearing. The mere mention of the words, doubtless, opens up a long array of bitter experiences to most of our practical readers. This is a trouble which is always found most frequently on goods which have been flocked and shrunk considerably. When such a piece as this comes along, we are too apt to think that the fault lies in the shear itself. To be sure, it may, but more likely the reverse will be found to be true. Hence, if our shear is known to work well, and has, all along, been shearing certain styles, which may have had different treatment, in a way that is quite satisfactory, we may be almost sure that the trouble is with the goods and not with the shear. Do not proceed to tinker with the blades in such a case, as the shear will then only be just as much off for the next piece, but when such a piece comes along, the perfect shearing may be greatly aided, if not altogether accomplished, by the following means:—Make the back friction roll perfectly tight, and cover the front delivering roll with cloth. Then, as fast as the cloth is delivered to the rest from the front, it is taken away at the back. Then drop the carriage so as not to cut the cloth, or admit of its being forced into the blades. In fact, this matter of tension on the cloth must be carefully attended to. The friction gear on the back roll is meant for the purpose of taking up the cloth as fast as it is delivered by the front one, and, if the cloth gets tighter on the front, the friction is supposed to remain the same, but it will be found, as a rule, that, in cases like the above, better results will always be obtained by tightening the back roll and then covering the front roll, so that it will deliver better than it did before. The reason for this step is quite evident. If the cloth is drawn tightly over the rest, then the thin places in the fabric are drawn so very tight that the blades cannot reach the nap to cut it off, and, hence, the only effect is on the thicker spots. But if, on the contrary, the cloth goes over loosely, it will be more likely to be cut evenly, as then the thin places will have far more chances of coming in contact with the cutting blades. It often happens that a piece is sheared barer on one side of the middle line than on the other. This trouble usually comes from improper or careless work by the shearer, and, if possible, the piece should be done over again before it is pressed, but, if the unevenness is not detected till after pressing, the evil is much harder to eradicate. Before anything can be done, in that case, the goods must be well steamed off, so that all the press gloss disappears, and the nap assumes, as nearly as possible, its original position. Then a few runs on the finishing shear, if properly and carefully done, will, in great part, right matters again, and give our piece to the consumer in as good shape as ever. Another trouble which often comes along to bother the shearer, as it has already bothered the fuller, gigger, and dryer, before him, is tight or loose listings. The listing is either made of such a grade of stock, or else is so woven, that, from the fact of its being so much tighter than the rest of the cloth, the sides of the piece lie close to the rest, while the middle hangs loose or quite slack. This will, most naturally, cause trouble and imperfect work, as the middle, being slack, will be sure to shear out the quickest and the easiest. Fortunately, there are one or two ways of partially remedying this all-too-frequent evil, but it is doubtful whether it can be wholly overcome. First, shear the middle about as low as is required, then drop one or two notches, and also one-eighth on the rest, and one-eighth on the carriage. This, then, will shear out one side. Then raise five notches, and also the carriage, and rest one-quarter of a turn of the screw, and this will enable the operative to shear out the remaining side. Then even up all for the next piece. Properly speaking, goods ought never to come in such shape as to make a resort to this method necessary. Still, when it does come, it is none the less a difficulty, which is exceedingly perplexing, and is almost sure to lead to very bad work. Quite as much of a nuisance is it to have the selvages or listings loose and the middle of the piece tight. In this case, the sides are apt to shove into the blades in wrinkles, and hence become cut and hacked up in a terrible way. All finishers know very well what this means, and how hard it is to treat such goods all through the whole process of finishing. At the gigs, it is impossible to clear the sides of the piece out as well as the middle, and, hence, when the piece comes to the shears, the sides and middle cannot be made to compare. After the shearing at the press, much bad work is the result of this difficulty, and all that remains is to do the best we can. Try hard to have the right kind of stock put into the listing, and have it put in, too, in such a way that the selvages will pull and finish just like the rest of the piece. Then, and not till then, can we expect proper results. Of course, it is possible that loose or tight selvages may be caused, or, at least, made worse than they otherwise would be by bad work in the fulling mill, but, if we see to it that the selvages are well tacked together, and that the upright front rolls are set well together, and the soaping properly done, we can almost, to a certainty, lay the real cause of the difficulty on some other man's shoulders. One more point, which cannot be too strongly insisted upon, is keep your shears clean. No matter how much you may be pressed with work, see to it that your shears, in all parts, are kept well oiled and perfectly clean. It is the poorest sort of economy imaginable to try to run, day after day, without properly cleaning up. It is a fact, which practice will demonstrate, that time spent in cleaning up, often and well, is time well spent, and that result will soon be evidenced in better work and more perfect cloth. The accumulation of flocks at the back of the cylinder, or revolver, is only one aspect of this previous remark. It is best to insist on having them removed, before any quantity is allowed to gather. Some say that it is dangerous to remove the flocks while the shear is running, but it seems to us, in our own experience, that it can be done with little or no trouble after the operative has once learned the "how." Still, it would be better for the shear to be stopped entirely than to have the flocks accumulate, and thus run the risk of dulling the blades. It is, no doubt, owing partly to this cause that we have trouble from pulling of the nap and skipping here and there through the piece. This flock that is taken from the shear should be carefully looked after, as it can be worked up, in connection with other grades, to very good advantage. Every finisher should be well enough acquainted with the economies of his department to make good and profitable work of his shear flocks, as well as that from the fulling mills and gigs. On the fine grades of cloths, clean shear and gig flocks work very well. Grind equal quantities of shear and gig flocks, and then add or mix with this half as much uncut shear flocks, and we shall have an article which will full nicely with the cloth. Since the staple of

the uncut flocks is long, it will felt nicely with the nap on the back of the fabric, and thus help to retain the finer flocks. Be careful in passing through the shear the seam by which the ends of the cut are sewed together. In these times of keen competition, we cannot spare six or eight inches for the cut number at the heading ends of each piece. It is not necessary to allow more than three inches at the most, and if the operator is careful, not a little saving may be effected in this simple way. When the blades are raised, be careful to let them down again gradually and easily, not with a heavy jar, as such will always lead to trouble in the end.—*Boston Journal of Commerce.*

Colours for Dyeing.

The following process is given in a French patent for dyeing a fast blue on cotton, which can replace indigo. For 100 pounds cotton, boil, during two hours, in a bath containing eight pounds of extract of logwood, and ten pounds of soda crystals, allow to cool while in the bath, and wash and work for a quarter of an hour in a cold bath of ten pounds of sulphate of iron, then rinse, dry, and again enter into the first bath, to which has been added two pounds of extract of logwood and three pounds of soda crystals In this it is kept for one hour at from 80° to 100° Fahr., it is then washed, dried, and passed into a bath of soap and soda, then entered into a boiling bath containing five pounds of soap, five pounds of salt or sulphate of soda, and one and a half pound of aniline blue (to which no name is given, but, presumably, one of the direct dyeing cotton blues is used). In this bath, the cotton is worked for one hour, after which it is washed and dried.

A German chemist named Flimm has discovered another method (there are about a dozen known) of producing artificial indigo; it consists in heating mono-bromo-acetanelide with solid caustic soda until the mixture fuses and acquires a homogeneous brown colour. This product dissolved in water, and then sal ammoniac and ammonia added, becomes green, and, after exposure to the air, deposits indigo, or the brown product can be dissolved in dilute hydrochloric acid: addition of ferric chloride then causes the formation and deposition of indigo blue. As an indigo-making process, this is only of scientific interest, the resulting indigo being in small quantity, not more than four per cent of the acetanelide employed, and difficult to manage. What interests most in several of these quite commercially impracticable processes is that there exist some bodies, in perfect solution, which deposit indigo blue. Now if the operator, instead of trying to make indigo, would start with indigo blue, ready made, and find a convenient solvent for it, from which it would deposit without much loss, a valuable step would have been taken.

The patent granted to Carl Kellner of Vienna, for the process and apparatus for bleaching vegetable fibres, refers to electrolytic methods, and is said to be based upon the discovery that colouring substances adhering to the fibre are far more easily and rapidly converted into compounds, soluble in water, by alternately treating the fibrous material to be bleached with chlorine, or with compounds containing active chlorine and alkalies. It is assumed by the inventor that the ultimate action of chlorine is to change the insoluble colouring matter into a soluble one, but, before that stage is arrived at, the chlorine has converted the colouring matter into a substance which, though not soluble in water, is soluble in alkalies, and it is economical, both as regards material and time, to alternate the treatments of chlorine and alkali. Further, the process in general use is said to produce hydrochloric acid, and it is necessary to prolong the action of the chlorine until compounds, soluble in acids, are formed, which, it would appear, requires a further action of chlorine than is required to make compounds soluble in water. It is hardly worth enquiring whether the inventor's hypothesis on bleaching in general is well founded or not. In textiles, the alternating treatment with alkali and chlorine is very old, but this patent appears to refer only to bleaching matter in the shape of pulp.

AZO COLOURS ON COTTON, SILK, WOOL, &c.

Improvements in Azo colours consist in forming or producing a class of colours which have not previously been used as dyes on, or in, cotton or other textile fibre, by the combination of the diazotized various thio compounds derived from aniline, toluidines, xylidines, cumidines or napthylamines, with alpha or beta napthol, which combination is made in the presence of the fibre. When the combination to produce the colour on the fibre is required to be made, as in dyeing, it can be carried out by alternate dippings or impregnations of the fibre in, or with, a bath, in which any of the diazo compounds, named above, is in solution or suspension, in a very finely divided state, and in, or with, a bath in which alpha or beta napthol is in solution or suspension, without or, better, with an alkali. The order of the dippings or impregnations can be reversed or varied, and they can be repeated, if deeper shades of colour are required. If the colour is required to be produced in patterns, or partially, as in calico printing, the cloth can be impregnated, say, by padding in, or with, a solution of napthol and alkali dried, and the diazo compound can, when mixed with stiffening, be printed on in the usual manner, and the colour will be produced on the calico where the diazo compound and the napthol have come in contact. Good results can be obtained by previously oiling the fibre as for alizarine dyeing, or by forming thereon an insoluble metallic soap. The cotton, or other textile fibre, can be treated either in a raw state, or partially, or wholly, manufactured. As an example of the method by which these improvements can be carried into effect, the patentee takes, say, 50 lbs. of a paste containing about 10 lbs. of dry hydrochlorate of thioparatoluidine, in a finely divided state, mixes it well with 500 lbs. of water—the colder the better—adds 12 lbs. hydrochloric acid, 20° Beaumé—then 2¼ lbs. nitrite of soda in solution in 50 lbs. of cold water, and agitates the mixture, till as much of the diazo compound, so formed, has passed into solution as appears possible. He then dips, say, 2 lbs. of cotton yarn at a time (previously boiled out as usual) into the solution—wrings out, and passes it into a bath containing about 2 lbs. of either of the napthols, and 2 lbs, of caustic soda, 50° Beaumé, with 100 gallons of water, when the colour will be formed on the yarn, which can then be washed and dried. If the colour is found not to be strong enough, it can be replunged and wrung out of the diazo bath, and again in the napthol bath. The dipping can go on with fresh yarn each time, till the diazo bath is exhausted—the napthol bath being replenished from time to time with napthol and caustic soda. When the order of the operations is reversed, the napthol bath may be made much stronger, and the diazo bath weaker, than in the example. Thioparatoluidine, as is well known, can be produced by melting together sulphur and paratoluidine in various proportions and at various temperatures—products of a lower melting point producing more soluble diazo compounds than the products having the highest melting points. The other thio compounds mentioned can be employed in a similar manner. Though the example is given on cotton yarn, other fibres, such as silk, wool, and jute, can be treated in a similar manner.

WATERPROOF FABRICS FOR SURGICAL PURPOSES.

The invention relates to water-proof fabrics for surgical or curative purposes, such as the covering of wounds, the confining of poultices and the like, and has for its object the production of a thin, light, fabric, which shall be preferable to the prepared fabrics at present in use for the same purpose. To accomplish this, as a basis for treatment, a thin muslin or cambric is employed This thin woven fabric is treated with a preparation or solution of pure india-rubber, on both sides of the material. It is then subjected to what is known in the trade as steam vulcanization, by which means a soft and pliant water-proof fabric for surgical or curative purposes is made, much superior to those at present in use, whether the same be composed of oiled, or varnished, silk, or of woven cloths, treated with compounds of india-rubber and other substances on one side only, or a layer of such compounds between two woven fabrics, as, for the most part, obtains. Variations in the thickness of the cloth and the amount of india-rubber used may be made without departing from the peculiar character of the invention.

The Steaming of Twisted Worsted Yarn.

A correspondent in the *Deutsche Wollen-Gewerbe* says that the steaming of worsted yarn, especially twisted yarn, has long been recognized as a necessity in worsted mills, for, without this process, certain evils either could not be avoided at all, or only with the greatest difficulty, particularly in weaving. The tendency of the twisted thread to untwist, especially when in a slack condition, is one of these evils. This untwisting of the thread occurs principally at the torn or cut ends. The evils resulting from it are well known to every weaver. With multi-coloured twist-yarn, they consist principally in a difference in the colour of the thread, and this reaches as far as the untwisting has taken place, while, with single coloured yarn, the difference is noticeable in the lustre produced by the finishing of the weave, and this increases with the quantity untwisted. The good results produced by the steaming of thread have often been pointed out. Its influence is such that the thread, after steaming, retains its full twist at two torn ends, and loses its tendency to open, but the process has also its disadvantages in other respects, and to those we would now draw attention. In some worsted spinning mills, there is steaming apparatus furnished with a stretching arrangement, so as to submit the hanks in a stretched condition to the action of the steam. This exerts a highly favourable effect upon the spun yarn, but still more upon the twisted, for the latter gains both in smoothness and lustre. As regards the latter, we may illustrate the truth of this with the Cheviot worsteds, which are very much improved by the process. It is, of course, of great importance to have the stretching of the yarn performed conscientiously, because slack places in the hanks, or single threads, loops, snarls, blisters, &c., which are the result of careless stretching, are fixed by the steam, and cannot be removed again. If such a yarn is worked in a stretched condition, say, for warps, these defects are not of much importance, but, for the jobbing worsted spinning mill, it always entails losses, caused by a corresponding reduction in price of the objectionable yarn. When these faults occur, it is often the case that the spinner tries to lay the blame on the stretching arrangement. This must be wrong, because, if the stretching contrivance turn out one lot faultless, it is reasonable to conclude that the poor work is the result of want of care in the handling. It should be borne in mind, however, that the work can be rendered so difficult by a careless reeling that it is almost impossible for the operator to turn out perfect yarn. If the reel is not furnished with an arrangement which moves the table further away after a certain number of revolutions, thus preventing the hank of yarn from being heaped up in the centre, and placing each thread by the side of another one, the cause for these defects in the yarn is apparent.

The stretching arrangement cannot equalize the difference in length caused by the heaping on of the yarn, when this exceeds a certain limit. Let us suppose that the circumference of the reel is circular, with a diameter of 0·40 metre, then the lowest threads would have an approximate length of 1·26 metre. When the threads run on the top of each other, only two centimetres high, before the reel table is moved to a greater distance, the diameter amounts to 0·44 metre, and the top threads would have a circumferential length of more than 1·38 metre, which makes a difference of 12 centimetres. Of course, the circumference of the reel is not circular, but forms a sexagon or octagon, and the above figures expressing the circumference and also the difference would be modified somewhat. It is evident that the stretching arrangement cannot equalize this difference, and the upper threads of a hank must, by their greater slackness, cause the defective flaws in the yarn, which are fixed by the steam. There is still another condition which, in the steaming of the yarn on the stretching arrangement, has a tendency to make uneven places in the yarn. A proper amount of attention is seldom bestowed in worsted spinning mills upon the twisting of the D. and T. In other words, the twist is not in conformity with that of the single threads. Especially with long stapled wool, with which is to be classed the Cheviot wool, is it necessary to have the twists correspond to each other, so that, in the doubling of the single thread, the twist of the double, more or less, overcomes that of the single. By reason of its long staple, combed Cheviot wool is readily twisted, and if the twist of the D. and T., which is for this kind of yarn fairly open, does not neutralize that of the single thread, the unequal reeling above referred to causes loops and snarls, which become fixed in the yarn when steamed, and which detract both from its smoothness and quality. It often happens that the twisted thread splits at the eye of the loop, and each single thread curls into an independent one. When such places are not straightened out by the stretching arrangement, these double loops in the steamed yarn have a much more injurious effect than the single ones. During the twisting, also, faulty places may be made in the yarn by having one thread a little tighter than the other. As already stated, these suggestions are made principally with reference to worsted spinning and twisting. Observation will show that the defects mentioned are, in most cases, not due to the stretching arrangement, but are owing to the twisting and reeling.

Commercial and Wool Museums.

FIUME:—The Chamber of Commerce at Fiume has received official intimation from the Hungarian Minister of Commerce that it is the intention of the Government to establish shortly, in that town, a commercial museum, similar to that already existing in Buda-Pesth. The Chamber has decided to assist the establishment of this institution, and, with this object in view, has voted an annual subscription of 400 florins.

KHARKOW:—A company, having a capital of 500,000 roubles, has lately been formed, says the *Journal de la Chambre de Commerce de Constantinople*, at Kharkow, to promote small manufacturing industries, having for its objects the establishment of exhibitions in various towns of Southern Russia, a commercial museum at Kharkow, the procuring of models of small manufactures, and the publication of a special journal, which will be distributed gratuitously to those persons who wish to be in touch with all new inventions.

SYDNEY:—A recent development in the wool trade of this city, which is well worthy of attention, says the *Sydney Mail* of the 5th July, is the establishment of a wool museum by J. H. Geddes and Co., (the Pastoralists' Association), in the Association's Offices, near the Circular Quay. The museum is a large room admirably fitted with 220 compartments, apportioned into districts, which will contain only the choicest fleeces, from sheep bred in respective districts, arrived at under competitive examination at the different shows for the most valuable fleeces, showing the highest pecuniary yield. These fleeces will be marked with breeder's name, value (arrived at by wool experts), weight, age, and date of shearing, and will be on exhibition until superseded by next year's prize fleece. Assortments of wool in various stages of manufacture, and a fine collection of South American wools are exhibited, while books on sheep-breeding, artificial grasses, and upon other subjects of interest to pastoralists, are placed at the convenience of the visitors.

According to *Kemp's Mercantile Gazette*, the number of failures in England and Wales gazetted during the four weeks ending Saturday, September 27th, was 243. The number in the corresponding four weeks of last year was 285, showing a decrease of 42, being a net decrease in 1890, to date, of 452. In addition to these gazetted failures, there were 222 Deeds of Arrangement filed at the Bills of Sale Office during the same four weeks. The number filed in the corresponding four weeks of last year was 261, showing a decrease of 39, being a net decrease in 1890, to date, of 132. The number of Bills of Sale published in England and Wales for the four weeks ending Saturday, September 27th, was 577. The number in the corresponding four weeks of last year was 748, showing a decrease of 171, being a net decrease in 1890, to date, of 925. The number published in Ireland for the same four weeks was 33. The number in the corresponding four weeks of last year was 25, showing an increase of 8, being a net decrease in 1890, to date, of 56.

British Trade in Southern Persia.

The British Consular reports from Bushire, for some years past, according to Consul-General Ross's latest report, have frequently alluded to the difficulties which are experienced by foreign merchants generally, carrying on business in Persia, and to certain measures which seemed requisite in order to place British and British Indian trade in the South of Persia on a fairer footing. Among the suggestions were the opening of the Karun river, the establishment of a British agency at Yezd, a revised commercial treaty, and an administrative reform to facilitate recovery of just claims from Persian debtors. The two first of these proposals are in a fair way of realization, and other measures not thought of ten years ago are now *faits accomplis*. With the advance of trade, however, the need for administrative reform is still more strongly felt, and, in this respect, no progress has been made, and the terms used to describe this want, more than 15 years ago, are still applicable. The evil threatens to assume dangerous proportions, from the increased tendency to fraudulent declarations of bankruptcy, under the facilities afforded by the venality of officials. If any method can be devised to provide for the just hearing and speedy settlement of claims of foreigners against Persian subjects, it will greatly benefit trade generally. Notwithstanding all difficulties, during the last 20 years, the trade of the South of Persia has steadily increased. Judging from the returns, the value of imports and exports of Bushire increased in 15 years (from 1873 to 1888) by about five million rupees, in a period of 10 years (from 1878 to 1888) the trade of the port of Bunder Abbas increased to a similar extent. From the present time, a fresh departure may be reckoned. The old order changes, and more rapid progress may be anticipated.

Technical Schools on the Continent.

The city of Berlin is about to open a new school for the theoretical and practical education of young manufacturers of the weaving, knitting, and *passementerie* industries. The course of instruction will be for two years, and will include studies of raw materials, their production, and the differences as to chemical and physical quality, the preparation and numbering of yarns, the products of weaving and knitting in plain and combined weaves, &c.; the composition and calculating of goods, with factory book-keeping; technical knowledge of apparatus and machines for weaving and knitting by hand or by power looms, and figured goods, comprising the various systems of looms and knitting machines; dyeing, printing, finishing, free-hand and machine drawing, designing and weaving of patterns; also the history of textile products, with practical work on all the machines in the school. The tuition will be 400 marks for two years. The weaving school at Wipkingen, near Zurich, Switzerland, during the past year, was attended by thirty-three pupils. Seventeen graduates found good positions. The school owns thirty-three looms, and a weaving machine, all of which were presents from Swiss loom builders. In the higher weaving school at Mulheim, Germany, since its organization in the year 1852, over 1,800 young manufacturers have graduated. The number of pupils last year was 114; the instruction was given by nine teachers, including the superintendent, and embraced theoretical and practical knowledge, and exercises in all branches of the textile industry, also languages and shorthand writing.

Eight Hours a Day.

Regarding the enactment by law of eight hours a day, or forty-eight hours per week, as the maximum amount of work for adults, it may not be uninteresting to make it known that in the weaving factory at Edenderry, near Belfast, which is the property of Messrs. John S. Brown and Sons, who are well known among the foremost in the production of the finest damask table-linens, doyleys, and cambric handkerchiefs, the question has been put to a practical test by their enterprising manager. Some two or three years since, Mr. Kirtland, the gentleman referred to, became impressed with the idea that he could reduce the period of weekly labour to five days, and give an entire holiday on Saturdays to all his workers, without injuriously affecting the interests of either master or *employee*. Having now had two years' experience, although the system was only at first tried as an experiment, he finds that all concerned are so well satisfied that they would, on no account, return to the old method. Briefly, the advantages gained have been:—an output equal to, and even greater than, before; the saving of steam, fuel, oil, &c., to the firm and to the workers; Saturdays to themselves, with wages equal to what they formerly earned in six days, because, knowing they would be off on Saturdays, they are as anxious to make up their full pay as their employer is to grant it. It has also been observed that there are fewer absentees on Monday mornings, and far less broken time. Should any employer or manager wish to try the experiment, particulars of the method of arrangement and system of working it may easily be obtained. It may serve better to elucidate the pros and cons of the discussion than hours spent in theorising on the platform of St. James's Hall

Original Designs.

On our first plate, we give a design for a Curtain, suitable for tapestry and other materials. It has been drawn by Mr. R. T. Lord, 10, Ann Place, Bradford.

* * * * *

On our second is a pattern for Linen Damask, suitable for a table cover and similar articles. This has been designed by C, W. Sandiforth, 103, Racecommon Road, Barnsley.

* * * * *

Our third contains a design for a Brussels Carpet.

Monthly Trade Reports.

LACE.—There has been a slightly improved feeling in the lace trade. Curtains and window blinds have sold largely, and, if the other branches were in such favour, producers would be on good terms with themselves. Silk and cotton millinery laces have had a dragging sale, and the same may be said of bobbin nets and other descriptions generally, but, as production has recently been kept down, manufacturers are being very firm in their prices, and as more inquiry has been made owing to the strike in Calais, they are not disposed to sell or to take orders unless at firm rates.

LINEN.—A steady business has been done in linens, during the month, with some slight exceptions. The better classes of drills, especially, have had a good demand, and this applies also to fine sheetings and bed linens generally. In domestic cloths, such as towellings, toilet, and tea tray covers, &c., there has been an average business, and as new fancy designs in these fabrics are being continually brought out, the outlook for this branch is cheerful. Prices are, as usual, rather low, but, in this respect, manufacturers are better satisfied than they were twelve months ago.

WOOLLEN.—There has not been a cheerful feeling exhibited in the woollen branches during the latter part of the month, although a fairly large business has been done in most classes of goods. In worsteds, there has been a slight falling off in demand, as well as in the better and lower kinds of woollens, but this quietness may only be temporary, and manufacturers are, as a rule, sanguine of a good business for some time to come. The serge branch has been very brisk, the demand for both plain and fancy cloths having been large, and the prospect seems to point to this class of fabric having a good demand for some time. In this kind of material, new and striking patterns are now being put on the market, they are an improvement, in every respect, on any that have been formerly produced. As regards cloths for the ready made clothing trade, there has been a rather quieter demand, and especially has this been the case in backed worsteds.

WOOL.—At the London wool sales, there have been some very spirited biddings, firmer prices having been established for the better and medium classes of wools generally, whilst the lower descriptions have not been so much sought after, and prices have favoured buyers slightly. In the Yorkshire districts, wools have been held firmly by staplers in sympathy with the London sales, and the tendency has been slightly upwards, although buying has been only for actual requirements. In the yarn branches, a fair number of orders has been given out, but these have generally been for light quantities, unless some special inducement has been held out by spinners, in the shape of lower prices, and this they have been indisposed to do, as they are generally fully employed on old contracts, and prefer to wait until these are nearer completion. The piece departments, as regards dress goods, have been rather more cheerful, and fair orders have been booked, both for home and foreign account. The coating branch is almost at a dead-lock, owing to the American tariff, and things are looking anything but bright for makers of these fabrics.

COTTON.—A decline in most classes of raw material is to be recorded during the month, although sales have been up to the average. The demand for yarn has been fairly good for most descriptions, and spinners, as a rule, are now in a comparatively comfortable position, both as regards orders and margin. Bundles for India, China, and Japan, have been sold to a very considerable extent, and though prices have usually been much complained about, no doubt the decline in cotton has enabled producers to see their way to satisfactory returns. In this class, stocks had already begun to accumulate, and the demand referred to probably prevented an extensive stoppage of machinery. Two-fold yarns for Japan have also been freely sold, and doublers of 2-32's and 2-42's are well under contract. Continental buyers have made numerous overtures, but their operations have invariably been restricted by insufficient limits. In cloth, the transactions of the month, though perhaps unequally distributed, will have accounted for a fair average, and the position of makers of the better Eastern staples remains much the same as was reported in our August summary. In other classes, however, noticeably Burnley printers and shirtings made in the Haslingden and Darwen districts, orders have been either unobtainable, or only so at ruinous limits. Finishing and bleaching materials generally have been in good request, and for Egypt, the Levant, South America, and the various smaller European markets, results will have been quite up to expectations. Home trade men also report satisfactory returns, in the sense of definite orders, as well as in proposals likely to become so.

Rhea and Similar Textile Fibres.

On another page will be noticed an advertisement of Raabe's Rhea and Textile Fibre Syndicate, which company is being privately promoted to carry on the decortication of Rhea and other similar fibrous plants in the fields where grown, and for the sale of the same in this and other countries. The idea which Mr. Raabe has carried out in his invention has been to treat the plants in such a manner as to produce a fibre which, in price, quality, and general suitableness, should compete with flax, and which should be the means of creating a separate industry, exactly as was the case with the jute industry. This is quite a different departure from that taken by other inventors, who have always desired and attempted to treat Rhea in such a manner as to be of general utility in the various branches of the textile trades. That this is an erroneous notion has been amply proved by the results, the special treatment to which the fibres have required to be subjected causing utter failure in point of price alone. The only chance for Rhea is, mainly, cheapness, and this cheapness must be combined with excellence of fibre, and this cannot be obtained by the aid of an expensive chemical and mechanical treatment. Therefore, manufacturers and scientific experts have agreed with the inventor that his idea is the right one, and his method of carrying out this idea is very satisfactory. The process is simple and inexpensive, and the cost of the fibre very low, compared with that of other processes. That a Rhea industry can now be established, with good prospects of success, appears to be certain. What is now required is that a few gentlemen in the textile trades should come forward and thoroughly investigate the system, with a view to joining the Syndicate, for the promotion of this industry. The inventor has just received overtures from gentlemen of position in Germany to take over the patents and patent rights, with a view of forming the Syndicate in that country. A cry against foreign competition has been, and is, daily made by manufacturers and, therefore, it rests with them to ensure the chances of a good industry being opened out in our own country, instead of in Germany. The invention has been patented in England, France, Austria-Hungary, Germany, Belgium, Italy, and the United States, and the method of business proposed to be adopted is to import the machines and decorticate the plants on the fields where the fibre is grown. And here we may state that large tracts of land are already at the disposal of the company for the cultivation of the plants. There are advantages in this arrangement. Native labour is much cheaper than in this country, and, as 25 per cent. of fibre is extracted from the stalks, it follows that carriage would be much less, as only one ton of fibre would be shipped in place of four tons of stalks, which would be required if the plant was decorticated in England. Therefore, the present estimate of price per ton of finished fibre could be materially reduced. Not only is the machinery specially applicable for the decortication of Rhea, but it is quite suitable for the treatment of other fibrous plants, as has been proved by the variety which has been experimented upon. The process is entirely mechanical. Further particulars and samples can be had on application to the Editors of this Journal, 10, Ann Place, Bradford, and arrangements can be made to see the machinery in operation.

The *Frankfurter Zeitung* contains an account of the expansion of cotton spinning in Germany, which shows that the spindle power added during the last two years exceeds 513,500 spindles. It is estimated that 40,000,000 marks have been invested in cotton mills during that time, and that this is probably an under-estimate, as many mills which have manifestly increased their spindle power have refused to make full returns. After giving details of the new spindles, the paper adds that, according to English statistics, the number of cotton spindles was, in 1888, 42,740,000 in Great Britain, 23,180,000 on the Continent, 13,500,000 in America, and 2,430,000 in East India. Taking the number of spindles in Germany at 5,500,000, the increase during the two years is 10 per cent.

The Arts and Crafts Exhibition was opened in Regent Street, London, on the 29th, ultimo. Decorative fabrics are in the ascendant. They are chaste in design, tasteful in colouring, and admirable in execution, and give striking proofs of the rapid strides that have been made in recent years in technical education. Among the exquisite embroideries exhibited is a wall hanging, representing the elements, designed by Mr. Heywood Sumner, and worked by the Misses Gillet and Smith, in gold thread, on a fawn coloured ground. Printed silks, satins, and velvets are extremely handsome, those in Tussah silk, executed by the family of Thos. Wardle, Esq., of Leek, in their permanent natural colours, seem to be the most attractive. Lace making is not extensively represented, but the specimens shown are excellent in design and perfect in workmanship. Mr. A. J. Rowe shows a wonderfully beautiful design for a lace flounce, and Miss M. Moore and Miss A. Ellis exhibit samples of point and Limerick laces.

DESIGNED BY R. T. LORD.

12TH OCTOBER, 1890.

CURTAIN.

LINEN DAMASK.

BRUSSELS CARPET

Fashionable Designs.

* * * * * A Supplement, containing Woven Specimens of the Designs given on this page, is presented each month to those of our Subscribers who manufacture Cloth for Ladies' and Gentlemen's wear.

Ours was the first Journal in this country to give woven samples of various descriptions of fabrics regularly each month, and since we commenced this feature, some years ago, it has, to some extent, been adopted by others. In matters connected with every branch of designing, we stand ahead of all other Journals.

No. 656.

Trousering or Suiting.

Pegging Plan.

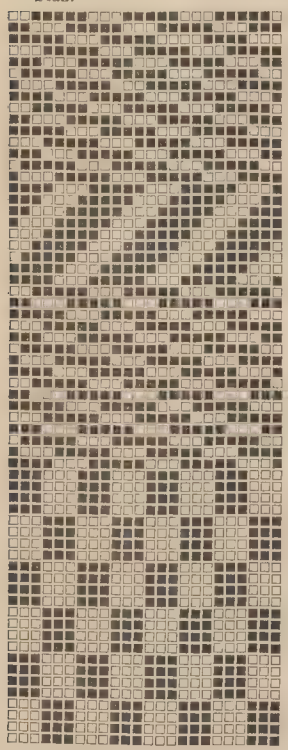
5,620 ends in warp; 88 ends per inch; 11's reed, 8 in a reed; 42 picks per inch; 64 inches wide in loom; 56 inches wide when finished. Weight 21 ozs.

Warp :—

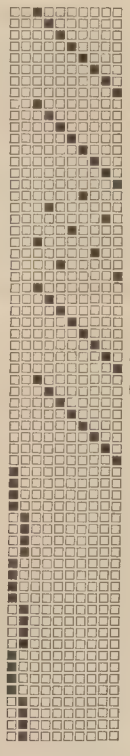
8 ends Twist, 2/48's worsted.
56 „ Black „ „

64 ends in pattern.

Weft all Black, 12 skeins.



Design.



Draft.

No. 657.

Mantle Cloths.

Design.

1,340 ends in warp; 21 ends per inch; 7's reed, 3 in a reed; 18 picks per inch; 64 inches wide in loom; 56 inches wide when finished. Weight 8½ ozs.

1 end grey, 19 skeins; 1 end brown, 19 skeins.

Weft :—16's skeins white.

No. 658.

Design.

1,470 ends in warp; 23 ends per inch; 5¾'s reed, 4 in a reed; 24 picks per inch; 64 inches wide in loom; 56 inches wide when finished. Weight 13 ozs.

Warp :—15 skeins.

Weft ;—14 skeins.

Trousering.

No. 659.

Design.

1,920 ends in warp; 30 ends per inch; 7½'s reed, 4 in a reed; 34 picks per inch; 64 inches wide in loom; 56 inches wide when finished. Weight 20¼ ozs.

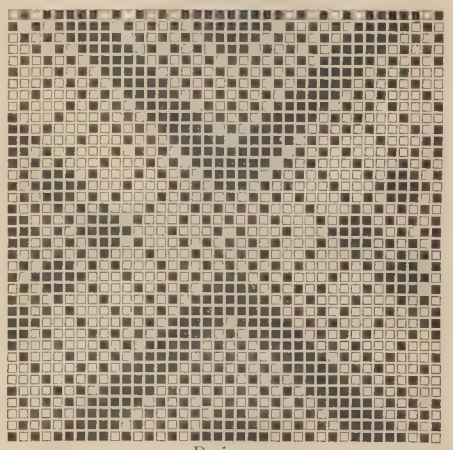
Weft :—12 skeins, all Black.

4 ends	Black, 14 skeins.	2 ends Blue and Black Twist,	14 skeins.
2 „	Slate, „ „	1 end Blue and Red Twist,	„ „
1 end	Black, „ „	2 ends Blue and Black Twist,	„ „
2 ends	Blue, „ „	1 end Black,	„ „
1 end	Black, „ „	2 ends Slate,	„ „
2 ends	Blue, „ „		
1 end	Black, „ „	30 Ends in Pattern,	
2 ends	Slate, „ „		
4 ends	Black, „ „		
2 ends	Slate, „ „		
1 end	Black, „ „		

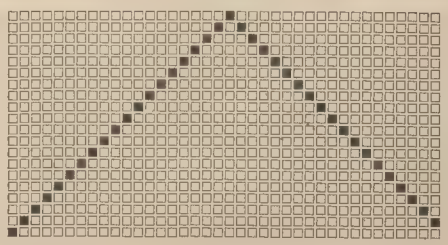
Cotton Dress Goods.

The following design is for Cotton Dress Goods, and should be woven as follows :—Warp and weft 2/36's, 45's sett, 50 picks per inch. In the Pegging Plan lift □. For Pegging Plan take first twenty ends in Design.

No. 660.



Design.

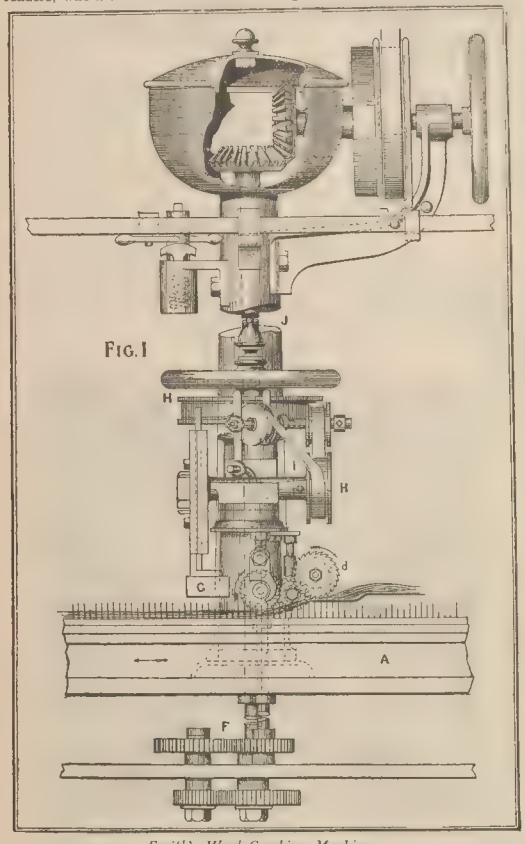


Draft.

MACHINERY, &C.

Smith's Wool Combing Machine.

There is, perhaps, no machine, in connection with the textile industries, in which so many minor improvements have, from time to time, been made, as has been the case with the wool combing machine, and in very few instances has apparatus been brought to so high a state of utility. But, notwithstanding this fact, patents are being continually taken out, in this and other countries, which have for their object the further perfecting of the machine, so that a greater production can be got from it, in a given time, at a less cost. It is an open question whether the majority of these inventions really benefit the apparatus, for, in many cases, it has been proved that some are a drawback in the combing of certain classes of wools, and militate against a large production rather than increase it. Amongst recent improvements, there is one that, after perusal of the following description, we are sure, our readers, who are interested in wool combing, will see is a decided advance,

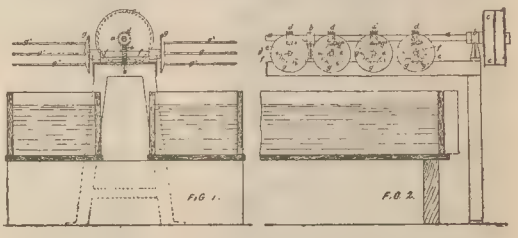


Smith's Wool Combing Machine.

as it dispenses with the expensive dabbing brushes, expensive because they have to be continually renewed, if good work is to be done by the machine. This improvement is the outcome of long experience in practical work with the combing machine, and the change has not been made without much thought and many experiments, the result aimed at being the superseding of the use of the dabbing brush by a simpler mechanism, and one that should not entail a continued outlay. Messrs. D. Smith and Co., Limited, of Halifax, who are large top makers, and who may be relied upon to have machines for combing their wools most effectually, are the patentees of the apparatus, and will be pleased to afford every opportunity of inspecting the machine in operation, and give all information respecting it. The following particulars of the mechanism will enable our readers to judge of the great advantages to be gained by the use of the improvements. As stated above, the main object of the invention is the dispensing with the use of dabbing brushes for forcing wool or other fibre into the teeth of revolving combs, and the substitution of a series of positively driven pressing wheels, which force the wool into the teeth of the comb with very satisfactory results, the fibre being pressed into the teeth with great regularity and without waste, in addition to which, the machine can be run at a greatly increased speed, and, therefore, more work can be done in a given time than by the ordinary arrangement of dabbing brush. The annexed drawing shews the improvements as applied to an ordinary Nobles' combing machine. A, represents the large circular comb, inside of which are the smaller circular combs. Pressing wheels revolve between the spaces of the pins of both large and small circles, and press the fibre down evenly and effectively. The pressing discs are driven by spur wheels. In combination with these driven discs, a small dabbing brush, *a*, is used, this is for preventing the fibre from rising out of the teeth after it has been pressed there, so that, as the circles leave each other at a tangent, with the fibre well in the teeth, the combing or lashing out of the fibre will be most effectually performed. The pressing disc, *d*, is for the purpose of guiding and pressing the fibre on to the steel plate, in readiness for being pressed by the subsequent discs into the teeth. Another important invention in connection with this machine is the driving of the circles. To effect this, a single pillar, J, is employed in the centre of the large circle for carrying the driving pulleys, which give the rotary motion to the several circles, by gearing, F, underneath the machine. By the use of one pillar, instead of the old arrangment of two, the parts are much simplified, and enable the removing and replacing of the small circles, when required to be done, in a more expeditious manner than by the old method. The speed of the improved machine can be greatly accelerated, and it is guaranteed that 25 per cent. more weight of production can be obtained from it per day with the improvements. The saving in the cost of brushes is also a very important item, as only a small brush is used, as stated above, to prevent the wool rising after the dabbing has been effected. Double and triple circles, with the improvements, have been in operation for more than twelve months, and have been satisfactory in every respect.

Improvements in Machinery or Apparatus for Dyeing or Washing Yarns.

There has, recently, been a number of machines patented for the purpose of dyeing yarns, each of which has something to recommend it to users. One of the latest relates to that class of mechanism, employed for either dyeing or washing hanks of yarn, in which revolving rollers are used for supporting the yarn in the vat or cistern of liquor, and is designed to simplify their construction. The machine is intended to be made double, that is with two



Hank-Dyeing Machines.

sets or series of revolving rollers or "winces" on each side, and two vats or cisterns. The invention illustrated consists, in the first place, of a simplified method or means of driving the machine, and, secondly, of an improved construction of the rollers or "winces." Fig. 1 is a transverse section, and Fig. 2 a partial side elevation, of a dyeing and washing apparatus, constructed according to this invention. A central shaft, *a*, is mounted on bearings, *b*, running the whole length of the machine, and driven by a band and pulley, *c*, on the end of the former. This shaft, *a*, is provided with "worms," *d*, at certain distances apart, see Fig. 2, which gear into, and drive, wheels, *e*, keyed on corresponding shafts, *f*, set at right angles thereto, on the framing of the machine. On each end of these latter shafts is fixed a disc, *g*, provided with prings, or projecting rods, *gx*, which form the skeleton "wince" or roller, over which the yarn passes. These rollers have usually been made solid, with squared sides, but, instead of this, three metal prongs are fixed on rods on the face of the disc, about equal distances apart, as shown at Fig. 2. This is found to be a very important feature of the invention, inasmuch as the skeleton form of the "wince" allows the air to circulate freely underneath the hank, and, consequently, a more even and better colour is produced; besides which the yarn will always have an angle to rest upon, which will give it a better grip, and prevent the yarn from slipping back when working, and the prongs or rods being free at one end, the hanks can be easily removed when required—an advantage not possessed by other forms of skeleton rollers or winces.

Another invention has reference to the means for, and the method of, dyeing hanks of yarn, the object of the invention being to subject or expose the yarn to the action of the dye liquor, contained in the vessel or tank, in such a manner that each and every portion of the yarn is equally dyed, thereby producing a level or equal colour, shade, or tint, of the yarn in each hank, and this is accomplished without the felting or intermingling of the threads of yarn with each other. In order to carry out this invention, an ordinary dye vessel is used, wherein are arranged, in suitable order, a number of guide pullleys, the peripheries of each of which, or of one or more, may be provided with teeth or projecting studs, capable of entering into the links of two endless chains, arranged lengthwise, one at each side of the

dye vessel, the said guide pulleys, one or more of them, being driven by suitable mechanism, deriving motion from any convenient shafting, for the purpose of giving a continuous traversing motion to the endless chains which pass over and around the said guide pulleys, from one end of the machine to the other. To each chain, a number of bobbins or creels are attached. These are placed in a vertical position, and arranged at equal distances apart, the bobbins on one chain being opposite the bobbins on the other chain. It is best to mount the bobbins on one chain, in slotted brackets projecting from one side of the said chain, so that the hanks, being first passed over the fixed bobbins, may be easily passed over those opposite, by moving them nearer the centre of the machine. This arrangement also enables the hanks to be distended as required, and will admit of smaller or larger hanks being attached to the same machine. Springs may be employed in conjunction with the slotted brackets. The hanks of yarn to be dyed, being placed over the bobbins as described, are distended horizontally across the machine, and are kept in a distended state, whilst the chain is traversing over the upper guide pulleys, but, when they pass down and under the lower guide pulleys, they are caused by the said pulleys to converge or approach each other and slacken the hanks, which are thus opened out by the resistance of the liquor to their traverse, and each thread of the yarn composing each hank is thereby exposed to the dye liquor, by which means the yarn throughout is dyed an equal or level colour, shade or tint, and this is accomplished without liability to the felting of the yarn. When the hanks are in a distended state, the bobbins are caused to turn a half revolution, or thereabouts, in order that the portion of yarn around the bobbins may be constantly changed, this being effected by means of suitable fingers or cam surfaces caused to project from the side or sides of the dye vessel, at stated intervals, and alternately or otherwise, by worm gearing or other arrangement of mechanism, such projecting fingers acting upon a cam, or its equivalent, connected with the axis of each bobbin. The number of turns given to the bobbins at each traverse of the chain depends upon the number of fingers employed. At one end of the vessel, the chain may be caused to pass over a guide pulley placed clear of the liquor in the vessel, so that the bobbins thereon shall be successively exposed whilst the machine is in operation, thus enabling the attendant to examine or note the degree of colour, shade, or tint, given to the yarn, and,

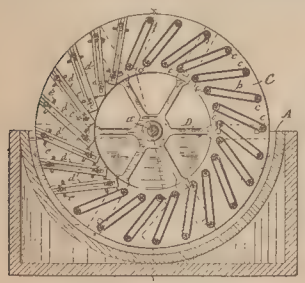


Fig 1.

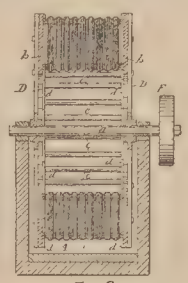


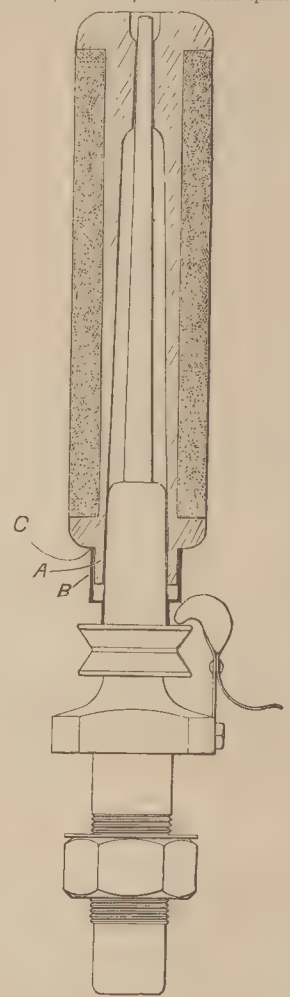
Fig 2

in this way, to ascertain when it is sufficiently dyed. When attaching or removing hanks of yarn from the bobbins, the apparatus above set forth is raised bodily out of the dye vessel by suitable mechanical means, and, if necessary, the chains may be made to travel, when so raised out of the dye liquor, in order to facilitate the emptying and filling of the bobbins, motion being given to one of the guide pulleys from an upright shaft or other source.

Another apparatus has been patented relating to the class of yarn dyeing machines in which a wheel or frame is arranged to rotate partly in and partly out of the vat containing the dye-liquor, and is provided in its interior with bars on which the skeins of yarn to be dyed are carried. The improvements consist in disposing the respective sets of yarn carrying bars in planes oblique to the radius of the rotary dipping wheel or frame, whereby the capacity of the latter of containing yarn is materially increased, and the skeins of yarn are carried in such positions as to cause them to be drawn partly end-wise and partly side-wise through the dye liquor, and thus the yarn is dyed more evenly, and without subjecting the same to the strain incident to the sagging of the yarn between the supporting bars. In the above drawing, Fig. 1 is a vertical transverse section of a dyeing machine embodying the invention, a number of the yarn carrying bars being bare to show the supports for the same on the wheel. Fig. 2 is a vertical longitudinal section on line *x*, *x*. Fig. 1, gives a detail view of the supports of the yarn carrying bars. A represents the vat containing the dye-liquor. Horizontally across the centre of the top portion of this vat, and journalled in suitable bearings in the sides thereof, is the shaft, *a*, of the dipping wheel, C, consisting of two annular end plates, *b*—*b*, secured to spiders, D—D, which are fastened to the aforesaid shaft. A pulley or gear wheel, F. is attached to one end of the shaft, to transmit motion thereto. *C*—*c* denote the yarn-carrying bars, which are arranged in sets or pairs, each of which is disposed in a plane oblique to the radius of the wheel, as shown in Fig. 1 of the drawing. Various means may be employed for sustaining the bars of each set or pair in the aforesaid planes, and a proper distance apart, to hold the skeins of yarn which extend around them. One of such means being represented in the form of parallel cleats, *d*—*d*, secured to the inner sides of the annular plates, *b*—*b*, in lines oblique to the radius of the wheel. The ends of the bars, *c*—*c*, entering between the said cleats, and by means of pins, *e*—*e*, passing through the cleats at the inner side of the outer bar, and at the outer side of the inner bar, the said bars are retained the requisite distance apart.

Sidebottom's Patent Improved Ring Bobbin.

In the production of ring spinning frames, great advances have been made during the past few years in their general efficiency, and much credit is due to individuals and to various firms in the Lancashire cotton districts for the part they have played in introducing the improvements, which have only been made possible by the expenditure of much money and labour in carrying out to a successful issue various experiments. One of the latest improvements, and one that is likely to make its mark speedily, is in connection with the "ring bobbin," and has been patented by the inventor, Mr. W. R. Sidebottom, who is a practical cotton spinner of the firm of



Sidebottom's Patent Improved Ring Bobbin.

Messrs. Kershaw, Leese and Co., India Mill, Stockport. Mr. Sidebottom's patent, which is strikingly simple, is somewhat of a new departure, but one that, already, has proved very favourable in every respect. The chief object aimed at by the inventor has been to obtain certain advantages by using, on ring frames, principally for spinning, what is known as a "two-headed" bobbin, or a bobbin with a flange at the bottom and another at the top, instead of the ordinary "copping motion" bobbin, and to effectively drive or rotate such bobbin. It has long been desired, and many times attempted, to use a two-headed bobbin on modern ring spinning frames, but the results have not been satisfactory, and there is no doubt that the success of Mr. Sidebottom will make other experimenters envious when they see the simplicity of his invention. One great difficulty hitherto that has had to be contended with has been the ensuring that, even with accurately made bobbins, the yarn should not overrun either the bottom or the top head or flange, which is the case unless the whole of the bobbins in a frame can be

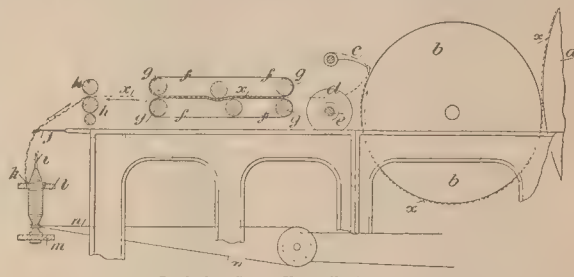
kept in one uniform position to suit the mechanical and unvarying traverse of the ring rail. By reference to the illustration, it will be seen that the foot, A, below the bottom flange of the bobbin which goes into the cup, B, is parallel in shape, as is also the internal surface of the cup itself. The uniform position of the bobbins referred to above is obtained by the bottom flange of each bobbin sitting upon the rim, C, of the cup, the projection below the flange fitting loosely in the cup. By preference, the flanges are covered with a metal shield for protection. The ESSENTIAL FEATURE of the invention is that no part, either at the top of the spindle, on the sleeve, or in the cup itself, does the bobbin *bind or fit tightly*. As is well known, it is customary with copping motion bobbins to taper the bottom part to fit the taper of the cup, and thus secure positive driving. It might be expected that the loose fitting on Mr. Sidebottom's plan would present a serious difficulty in rotating the bobbins, and that "slippage" would take place—such, however, is not the case. Beyond the fact that the bottom flange sits upon the top of the cup, the rotation of the spindle causes the bobbin to be forced against the outside surface of the spindle sleeve, or the inside of the cup, rotation being thus imparted to the bobbin. Mr. Sidebottom's achievement is a great success. Before deciding to adopt the system on anything like a large scale, he placed with Mr. Samuel Brooks an order for four ring spinning frames, two with the ordinary copping motion build and Rabbeth bobbins and two on his (Mr. Sidebottom's) patented system, with two headed bobbins, conditionally, that, whichever proved most satisfactory, the others should be altered to the same plan. These four frames were worked side by side for several months, and the advantages of Mr. Sidebottom's system were so obvious that the two frames with copping motion were altered to the system of two-headed bobbins, and a further order for 34 frames of 252 spindles each, 2⅛ in. guage, 1⅛ in. ring, 5 in. lift, was given to Mr. Brooks, and between 9,000 and 10,000 spindles are now at work, at Mr. Sidebottom's mill, made by Mr. Brooks on this system. Mr. Sidebottom claims the following advantages from the adoption of his patent. 1st.—Considerably more yarn can be got on a bobbin than with the ordinary copping motion, with the same size ring and lift. 2nd.—A saving of doffing, in consequence of more yarn obtained per bobbin. 3rd.—The lift being what is termed a "straight" one, or from bottom to top of the bobbin, the speed of the traveller is unvaried during the whole length of the lift, hence a more regular drag is obtained. With the copping motion, there is a rapid and constant variation in the speed of the traveller, and, therefore, in the drag, owing to the tapered form of build. 4th.—There is no straining of the spindles when doffing, the bobbins never sticking, but fitting quite loosely as named above. 5th.—Less time is taken to doff a frame. 6th.—In consequence of the extra length of yarn on each bobbin, knots are less frequent in the winding process. 7th.—When winding, the bobbins are pulled round, as is the case with ordinary copping motion bobbins, but, as the speed of the bobbin gradually increases as the quantity of yarn on the bobbins is reduced, there is no tendency to overrun, and no jerking of the bobbins, and, consequently, fewer breakages take place. Practically, an unlimited speed can be attained when winding, as the only limit is the number of spindles that a work-hand can efficiently attend to. There is a saving in doffers and winders' wages. After very careful comparisons, Messrs. Kershaw, Leese and Co., estimate that the saving is from 20 % to 25 % in both cases. Not only are the results entirely satisfactory to the firm, but, on account of the fewer doffings, etc., the workpeople have a decided preference for these frames. The counts spun by Messrs. Kershaw, Leese and Co., range from 20's to 32's, the ordinary average production on 22½ counts being from 43 to 44 hanks per spindle in 56 hours. Any invention which will tend to increase the margin of profit between the raw cotton and the finished yarn should, in these times, possess considerable interest for cotton spinners, and as Messrs. Kershaw, Leese and Co. are willing to show the frames by arrangement to bona-fide spinners, parties who contemplate ordering ring frames should apply to them for permission to see their frames at work.

Electric Knitting Machine.

In the last Paris Exhibition, amongst the weaving and knitting machines exhibited was one in which the design on the fabric, in two colours, was produced by an electrical contrivance attached to the ordinary machines. It was a good example of a case in which a very simple electrical attachment to a machine will perform an operation which would require a complicated apparatus to carry out mechanically, if it could be done at all. The machine is for making material like that for jerseys, hosiery, etc., which is made in the form of a cylinder, and is woven of a single thread, knitted on by a continuous circular movement of the knitting mechanism, similar to the way in which a stocking is knit. The design of two colours is produced by using two threads of the two colours, side by side, in place of the single one, being, therefore, practically the equivalent of a single thread, the two sides of which are coloured differently. These are led to the needles side by side, so that one of them hides the other, therefore, making one side of the material one colour, and the other side, the other colour. By merely interchanging the relative position of these two threads, a design of two colours is produced, the one on the back being the negative of the design on the face. This interchanging of these two threads is effected by means of two light guides, moved by an armature of a small electro magnet, which is attracted or released according as one or the other coloured thread is to form the face of the material. The current for this magnet is made or broken by a contact pin, sliding over the surface of a small rotating brass cylinder, on which the design has been painted with thin shellac or other insulating compound. Whenever the pin passes over the shellac, the circuit is broken. This design cylinder is rotating in exact correspondence with the cylinder of material which is being woven, and has also a corresponding axial motion, so that the position of the contact pin on the design cylinder corresponds exactly to the place on the material where the thread is being woven into it. The exact place where the threads are to be interchanged corresponds, therefore, to the place where the current is made or broken by the design of shellac on the brass cylinder. By rotating this design cylinder two or three times as fast, the design will be produced in two or three places respectively on the material; by increasing or diminishing the axial motion of the design cylinder, the design will be shortened or elongated respectively on the material, producing quite different effects. The original design is evidently not limited in any way as to its shape, outline, irregularity, or simplicity. Owing to the nature of the weaving, the colour on the back of the material shows through slightly on the face, making the design slightly less definite and prominent. The operation of weaving a coloured thread into such material was done before by mechanical means, but it was limited to geometric patterns, and the mode of weaving in the coloured thread rendered the material inelastic.

Machine for producing Cotton like Wool Yarns.

A machine for the production of cotton yarn, having a more wool-like appearance than ordinary cotton yarns, has been patented. Cotton yarn has been produced from mixtures of dyed and undyed cotton, and previously to the present invention, it has been the practice to divide the fleece of carded mixture into narrow slips or slivers, and to wind these strips on to bobbins which have been transferred to the spinning frames. According to this patent, a condenser carding engine, with ring spinning spindles, is



Producing Cotton Yarn like Wool Yarns.

arranged so that the strips of divided fleece are led directly to the spindles, and are twisted to a suitable extent and wound in the condition of yarn upon the bobbins, tubes, or spindles, as the case may be. Between the condenser rubbers and the spindles, nipping rollers are interposed, which are driven at a speed suitable to pass forward the ends from the condenser, the said rollers also checking the passing backward of the twist. By thus combining together the carding and spinning operations, winding the divided fleece upon bobbins, and the intricate apparatus for effecting such winding, are dispensed with, and a yarn similar in appearance to yarn produced from wool or mixtures of wool and cotton is obtained. The annexed drawing shows the delivery end of a carding engine fitted with spindles and nipping rollers for the purpose of carrying this invention into effect. Only the parts which are requisite for the purpose of explanation are shown in the drawing. The broken portion of a cylinder marked *a* is a portion of the carding engine main cylinder. The doffing cylinder is marked *b*, and the doffing comb *c*. The fleece is indicated by the dotted line marked *x*. When the fleece, *x*, is removed from the doffing cylinder, *b*, by the comb, *c*, it is led between a series of discs, *d*, which are threaded upon a common centre, *e*. These discs, or it might be any other dividing means, split the fleece up into a corresponding number of strips of sliver, each strip being thereafter twisted into a yarn. The sliver strips now enter between the endless travelling aprons, *f f*, carried on rollers, *g g*, and constituting the condenser rubber. This condenser rubber is, at present, in common use and, therefore, in itself, forms no part of this invention. One of the rubber aprons, or it might be each apron, receives a reciprocatory motion at right angles to the direction of traverse. The consequence is that, in their progress through the rubber, the strips of sliver, *x*, are rubbed and rolled between the aprons, an operation which assists to equalize, consolidate, and distribute, inequalities, preparatory to the fibres being twisted together. More than one of these rubbing aprons can be arranged so that the strips of sliver pass from one to the other, in which case one rubber may be driven faster than the preceding one. Upon leaving the rubber, *f f*, the sliver strips, *x*, pass forward to the nipping rollers, *h*. These nipping rollers are driven at a speed suitable to pass forward the strips, *x*, and also prevent the twist given by the spindles, *i*, from passing backward to the rubber. After passing between the nipping rollers, the ends, *x*, are led through guides, *j*, to the travellers, *k*, whereby the twisting and winding are effected upon the revolving spindles, *i*, as is well understood. The building rail is marked *l*, and the bottom rail *m*. The spindles, *i*, are driven by bands, *n*, and a drum, which receives motion from the axis of the main cylinder, *a*, or from any other suitable moving part of the carding engine. The fibres in each sliver strip, *x*, are twisted together like so many ends, and form yarns which possess the appearance of wool yarns, and are applicable in the manufacture of many fabrics and articles, in the making of which the employment of wool yarns has hitherto been considered an essential. The patentee does not confine himself to the ues of the before-mentioned mixtures of cotton, nor to the application of the invention to the production of cotton yarns only, as it may be found to be applicable, with advantage, in the production of yarns from other textile materials.

Fox and Williams' Patent Fusible Metallic Cement.

The testimony of a large and increasing number of users of Fox and Williams' cement, including several eminent engineers, is of a highly satisfactory character. The fusible metallic cement is a compound of metals, which gives it a very great advantage over Portland and Roman cements or lead. It is exceedingly hard, strong, and durable, and rings with a sweet, clean, metallic ring. Neither damp, oils, nor acids have the smallest effect upon it, and it will stand any amount of vibration, and will not crumble nor grind up. It melts like lead at a low temperature, and flows as thin as water into the smallest crevice or cavity. This cement adheres with extraordinary tenacity and strength to stone, brick, iron, or timber. It expands when setting, and requires neither caulking nor beating up. When it is run into engine beds or walls shaken by the action of an engine or gearing, it becomes one solid block or mass, and stops vibration and oscillation completely. Experience proves that this cement makes excellent joints in stone or cast iron cisterns. It is of the highest possible importance to engineers and steam users generally for bedding heavy machinery, tools, plates, columns, girders, castings, and for fastening heavy fixings and wall boxes in brick or stone work. On account of its many advantages, we have no hesitation in bringing it before the notice of steam users in factories and mills, who will find that it is a most valuable cement, and fully deserving of the high encomiums passed upon it by practical men. The cement is made by Messrs. Fox and Williams, Globe Fusible Cement Works, King Street, Hulme, Manchester, who will be pleased to furnish full particulars, estimates, and prices, on application.

An Improvement in the Production of an Indigo Vat.

The existing system of forming an indigo vat has drawbacks, which make it not only inconvenient but expensive. Schutzenberger's hydro-sulphite vat has also similar drawbacks. On the addition of lime to the hydro-sulphite of zinc, a large precipitate of zinc hydrate is formed, which causes the vat to be muddy, and renders it impossible to regain all the re-oxydized indigo. To prevent this drawback, the inventor proceeds in the following manner:—He takes 150 lbs. of sodium bi-sulphite, containing about 33 % of $Na\,H\,S\,O_3$ and treats it with 8 lbs. of zinc dust or other metal, until the reduction is complete. The liquor is separated from the precipitate by filtration or decantation in suitable vessels, and, to the solution obtained, a sufficient quantity of sodium sulphide is added to precipitate all the zinc as zinc sulphide. The liquid is filtered or separated in a suitable way, and forms, after the addition of a little caustic soda, an excellent vat for the reduction of indigo. The zinc sulphide forms a very valuable bye product in many ways.

Flax Culture in Canada for British Markets.

The *Canadian Gazette* says that Mr. C. W. Vincent, who recently arrived in Ottawa from England, has had an interview with the Minister of Agriculture relative to the growing of flax in Canada. This is a matter to which Mr. Carling has given considerable attention of late, and he was deeply interested in the scheme laid before him. The plan proposed is that certain working centres shall be established by the English company which Mr. Vincent represents, at which the fibre will be received from the farmers. The latter is to be prepared from the straw during the winter season, and at a time when the farmer's labourer is not profitably employed. The scheme is of public importance in view of the facts which Mr. Carling has recently pointed out. At present, Canada sends neither flax, seed, nor fibre, across the Atlantic, although Great Britain annually imports 20,000,000 bushels of one and 180,000,000 pounds of the other. In many parts of Canada, flax may be grown profitably, and with so large a market open in Great Britain, it would be of general advantage if the Dominion could produce a fair share. In this relation, it may be said that experiments with flax are this year being made at all the trial farms, and useful information is expected therefrom.

Odds and Ends.

A silver medal has been awarded to The New Textile Syndicate, Gomersal, Leeds, by the Jurors of the Edinburgh Exhibition, for vegetable wool and yarns. The award shows that the opinion of the Jurors fully bears out that which we expressed some time ago in our Journal, relative to the merits of this vegetable wool. Manufacturers who have not seen the samples should lose no time in writing for specimens to Messrs. H. and R. T. Lord, 10, Ann Place, Bradford.

A well known engineer has discovered that the *guimbombo*, which is a plant growing in Mexico, produces a fibre very much like silk, and much finer than ramie. The fibre is long, strong, and of a silky touch, and can be manipulated in the same manner as cotton. Other advantages are that the fruit can be used, and furnishes an excellent food. The raising of the plant is very simple, and only little attention needs to be paid to its cultivation.

Cases of lead poisoning among jacquard weavers have occurred, and have been traced to the dust from the leaden weights which are used by the weavers to carry the thread of their warp. After the varnish has been rubbed off from the weights, the lead begins to wear away, and falls in fine particles among the dust on the floor. In some cases, the dust contains as much as 56 per cent of lead, and, when the utmost care has been taken, 9 or 10 per cent of lead has been found in it.

A *Standard* telegram from Paris says:—Several of the principal factory owners of Roubaix have left, with their families, for a trip to Tashkend. The inducement for this somewhat new departure—for French manufacturers are not given to travelling far—came from General Annenkoff. On the occasion of his recent visit to France, he informed the Roubaix manufacturers, at one of the banquets given in his honour in that town, that he aimed at making Roubaix an outlet for the great wool-producing centres of Central Asia.

To purify the atmosphere in workshops:—Take a spoonful of oil of turpentine and shake it thoroughly in a quart bottle of spring water, until the latter becomes clouded or white. Sprinkle this mixture frequently around, and not only will the air become pure, but many of the lower organisms existing in it will be rendered harmless and the smell removed. A little acetic acid is an invaluable adjunct to the mixture. The reviving effect of its aroma, which quickly spreads around, is surprising, and the materials can be had at a very low price.

Personal and Trade Notes.

New York has eight women working as factory inspectors.

The dyers of Rheims are only earning 2¼d. per hour, and they work twelve and, sometimes, fourteen hours per day.

A new company has been registered, under the title of John Hetherington and Sons, Limited, with a capital of £250,000, in £20 shares.

Messrs. Woodhouse and Rawson, United, Limited, have been awarded a silver medal at the Amsterdam Exhibition for their show of electric apparatus.

A new company is being formed to take over the cotton spinning mill, weaving shed, and other buildings, now known as the Acre Mill, Haslingden. The capital is £40,000, in £5 shares.

Mr. James Greenwood, worsted manufacturer, senior partner of the firm of James Greenwood and Co., West End Shed, Halifax, died at his residence, Sunnyside, Lightcliffe, on Thursday, the 2nd inst.

The death of Mr. Cyrus Haggas, senior member of the well-known firm of Shelah Haggas and Sons, spindle makers, of Keighley, died suddenly on the 18th ultimo. at his residence at the above town.

The Neville Mill Co., Oldham, has been registered as a limited company, with a capital of £70,000, in £5 shares, to acquire the Neville Mill, and to carry on the business of cotton spinning, doubling and weaving.

Messrs. Matthews and Yates, Todd Street Works, Victoria Station Approach, Manchester, have fitted the Works of Messrs. G. and J. Shepherd, Holmes Mills, Bacup, with their patent humidifiers, which are giving entire satisfaction.

Mr. Lee Bapty, general manager of the International Exhibition, Edinburgh, who was so successful in his work in connection with the Exhibition in Manchester, has accepted a similar appointment offered him in Jamaica, by the Governor of that place.

A limited company, with a capital of £20,000, in £5 shares, has been formed to carry on the business of silk spinners and throwsters, and other branches of silk manufacture, formerly conducted at the Bent Ley Silk Mills, by the late firm of William Bamford and Sons, Meltham, Huddersfield.

Messrs. R. Dewhirst and Co., Limited, has been registered, with a capital of £100,000, in £5 shares, to acquire and take over, as a going concern, the business of printers and embossers of woollen, worsted, cotton, and other fabrics, materials, &c., carried on by R. Dewhirst and Co., at Birstall.

The firm of John Smith and Sons, Field Head Mills, Bradford, wool combers and worsted spinners, has been registered, with a capital of £250,000, in £100 shares, to carry on the business of wool merchants, wool combers, worsted and woollen spinners, yarn merchants, dyers, grease extractors, and mill owners.

A new variety of cotton was discovered a few seasons ago at Benba, in Egypt. It produces a much larger proportion of cotton to seed sown, attains its full growth earlier, and is much less susceptible to atmospheric influences, than any other kind known. The "Mitafife," for that is the name by which it is known, is shorter in the staple, and not quite so good in quality as the ashmouni plant, but still it seems to be driving the latter out of the field, and Vice-Consul Alban reports that last year's crops were so encouraging, in some parts of lower Egypt, that, this year, it has been sown to the almost entire seclusion of any other description.

Under date of August 30, the Calico Printers' Association has issued a circular calling the attention of the trade to the decision recently arrived at only to accept work on the basis of so much per yard of 36 inches, instead of contracting for pieces as formerly. To this circular is appended the names of all the principal printing concerns in the Manchester district. This action on the part of the Association promises to avert the disunion which at one time seemed imminent. Now that it is known everywhere that a firm front is to be shown, there is a very much better chance of permanent good accruing to the trade.

An important ukase has been issued from St. Petersburg, raising all customs duties to the extent of 20 per cent., with the exception of those on coal, peat, and coke. the duties on which, in the ports of the Black Sea and and Sea of Azof, will be 40 per cent. The duties on some national products, as well as those on coal, coke and peat, imported through the western frontier and the Baltic ports will not be raised. These regulations will come into force immediately. The object of the measure is to make the duties, which are levied in gold, correspond with the altered rate of exchange. The present measures are decreed without prejudice to the contemplated general revision of the customs tariff.

PATENTS.

Applications for Letters Patent.

Animalizing cotton, &c. S. Pitt, London. 5th Sept. 13,997
Bearings for wharles and tubes of spinning and twisting machines. W. S. Clapham and C. Haggas, Keighley. 1st Sept. 13,708
Bobbins for throstle spinning and doubling frames. E. Dyson, London. 3rd Sept. 13,834
Bobbins and spools. J. and D. Clayton, Bradford. 24th Sept. 15,105
Bowls or pulleys for looms, also jacks. W. Crowther, Huddersfield. 29th Sept. 15,359
Colouring materials. J. Dawson and R. Hirsch, Huddersfield. 1st Sept. 13,710
Covering textile rollers. J. Shepherd, Davenport. 1st Sept. 13,711
Cotton gins. H. H. Lake, London. 2nd Sept. 13,775
Cotton gin roller. H. H. Lake London. 2nd Sept. 13,786
Carding engines. G. and E. Ashworth, Manchester. 3rd Sept. 13,813
Colouring matters. J. Y. Johnson, London. 12th Sept. 14,416
Cotton colour. J. Dawson and R. Hirsch, Huddersfield. 13th Sept. 14,432
Colouring matters. B. Willcox, London. 16th Sept. 14,621
Cotton gins. W. R. Lake, London. 23rd Sept. 15,042
Colouring matters. O. Imray, London. 24th Sept. 15,120
Colouring matters. B. Willcox, London. 27th Sept. 15,345
Colouring matters. S. Pitt, London. 27th Sept. 15,346 and 15,347
Clothing for carding engine cylinders and flats, &c. E. Appenzeller, Manchester. 30th Sept. 15,421
Clamping and holding flax, &c., while scutching and hackling. J. W. Breriton, Dublin. 1st Oct. 15,504
Decorticating or scutching. T. Burrows, London. 2nd Sept. 13,738
Dyeing cotton. T. Ingham, Manchester. 11th Sept. 14,302
Dyeing, sizing, and washing. J. Robertshaw, Manchester. 12th Sept. 14,372
Dyeing raw cotton aniline black. E. T. Aucher, London. 12th Sept. 14,399
Dyeing wool, cotton, &c., black. J. H. Gartside and W. Warr, Manchester. 5th Sept. 13,968
Dye-stuffs. J. Y. Johnson, London. 16th Sept. 14,620
Dyeing and printing (sulpho-acid for). J. Y. Johnson, London. 19th Sept. 14,836
Dyeing, bleaching, &c., cops of yarn, &c. W. P. Thompson, Liverpool. 20th Sept. 14,897
Dressing or finishing linen. R. Paton, Belfast. 24th Sept. 15,076
Dyeing mixtures of animal and vegetable fibre. J. Wright, London. 26th Sept. 15,246
Embroidering machines. L. Lindley, London. 13th Sept. 14,458
Embroidering machines. P. H. and J. C. Dietrich, London. 20th Sept. 14,903
Fastening wheels of shuttles (loom). T. G. Walker, London. 3rd Sept. 13,835
Fibres from esparto, ramie, &c. A. H. Norman, Colchester. 2nd Sept. 13,756
Fabric, &c., printing presses. W. H. Townsend, London. 17th Sept. 14,699
Fabric (ornamental), for curtains, &c. M. Dean, Manchester. 29th Sept. 15,356
Fabrics (waterproof). C. R. F. Schloesser and J. M. Campbell, Manchester. 2nd Oct. 15,580
Heels of stockings and socks. H. and E. C. Kilby and R. S. Seller, London. 25th Sept. 15,181
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Jacquard design-reading and card-punching machines. R. W. Moncrieff, London. 6th Sept. 14,044
Jacquard machines. A. and J. Flather and D. Wright, Bradford. 13th Sept. 14,451
Jacquards and bars. R. Scott, Nottingham. 3rd Oct. 15,649
Knitting machines. G. F. Sturgess, Leicester. 1st Sept. 15,706
Knitting machine needles. G. F. Grasser, London. 5th Sept. 14,000
Knitting machines (circular). W. Brown, Leicester. 6th Sept. 14,013
Knit fabrics (fashioned). A. Levy and W. Start, London. 13th Sept. 14,472
Knitting machines (circular). M. and T. M. Pullen, Halifax. 17th Sept. 14,665
Knitted garments. S. Hodgkinson, London. 19th Sept. 14,811
Knitting machines (circular). J. C. Smith, London. 19th Sept. 14,813
Knitted stockings. W. J. Ford, Leicester. 22nd Sept. 14,929
Knitting frames (tube). C. A. Roscher, London. 24th Sept. 15,117
Knitted ribbed fabrics. L. and C. R. Woodward, London. 24th Sept. 15,132
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Loom temples. S. Darragh, Glasgow. 10th Sept. 14,234
Looms. W. R. Lake, London. 22nd Sept. 14,960
Looms. J. Holden and W. Catterall, Halifax. 24th Sept. 15,075
Looms (going part for supporting warp). J. T. Thornton, Huddersfield. 1st Oct. 15,497
Lace curtains, &c. E. Doughty, Nottingham. 1st Oct. 15,510
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Mules and twiners—drawing-out motion. J. Loftus, Manchester. 2nd Oct. 15,592
Measuring fabrics. C. Chevron, Manchester. 4th Oct. 15,702
Obtaining fibrous material from ramie, &c. E. C. Marc, London. 15th Sept. 14,535
Obtaining fibres from vegetable substances and apparatus. D. Barnett, Glasgow. 30th Sept. 15,428
Preparing, spinning, doubling, &c. J. W. Bullock, Manchester. 5th Sept. 13,966
Picking motion (loom). S. Thompson, London. 13th Sept. 14,440
Producing plain or partially plain selvages in twilled fabrics. W. Dent, J. Pickles, R. Whitaker and T. Scholfield, London. 15th Sept. 14,503
Pegs and lags for loom dobbies, &c. J. T. Lishman, Bradford. 24th Sept. 15,098
Pile and looped fabrics. J. Park, Keighley, 25th Sept. 15,155
Producing woodbury type pictures on textile fabrics. G. C. Whitfield, London. 27th Sept. 15,306
Protector for ladies' stockings. S. I. and J. G. East, Newcastle-on-Tyne. 3rd Oct. 15,650
Pickers for looms. D. Batchelor and T. C. Keay, Glasgow. 4th Oct. 15,717
Reels (cotton, &c.). S. J. Carey, Birmingham. 2nd Sept. 13,771
Rolling and unrolling woven fabrics and appliances. H. Payne, Glasgow. 5th Sept. 13,970
Ring frames for spinning, &c. R. Ainscow and J. Whalley, Manchester. 10th Sept. 14,213
Ring spinning. W. L. Wise, London. 10th Sept. 14,242
Ring and traveller spinning and doubling. T. Wrigley, Manchester. 13th Sept. 14,423
Rings used in frames for spinning and doubling. R. A. Johnson and R. Brewster, London. 24th Sept. 15,134
Ripping and clipping lappets, dress-cloths, or other spotted woven fabrics. J. Marshall, Bradford. 1st Oct. 15,514
Spinning spindles. J. A. Rouge, London. 5th Sept. 13,986
Stockings. F. Jackson and T. Everard, London. 9th Sept. 14,174
Stop motion (ring spinning frame). R. Hohf, Manchester. 13th Sept. 14,449
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Shedding motions of looms. J. Wilkinson and J. Shackleton, London. 16th Sept. 14,588
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Shuttles of looms. T. W. Wilson, Bradford. 26th Sept. 15,238
Shuttle operating mechanism for looms. J. A. Tucker, London. 30th Sept. 15,477
Travellers for spinning, &c. A. W. Metcalfe, Bradford. 4th Sept. 13,872
Treatment of long staple stalk fibres. K. T. Sutherland and G. Esdaile, Manchester. 5th Sept. 13,965
Treating silk or mixed silk fabrics to give the appearance of China crape. D. Gautillon, London. 10th Sept. 14,246
Tentering machines. J. W. W. Shaw and J. Stott, Bradford. 13th Sept. 14,453
Traverse-warp taffeta, &c., machines. F. Sudbury, London. 13th Sept. 14,457
Twisting or doubling. W. J. Ford, Leicester. 3rd Oct. 15,656
Winding, doubling, and twisting yarns or threads. J. Farrar, Halifax. 3rd Sept, 13,821
Washing, mordanting, dyeing spun and unspun textile fibres. G. Jagenburg, London. 3rd Sept. 13,861
Washing, bleaching, dyeing, &c. O. Hoffmann, London. 19th Sept. 14,839
Yarn guide traverse motion. J. Thorpe, Manchester. 19th Sept. 14,797

Patents Sealed.

9,758	11,336	13,291	13,473	13,626	18,249	20,477	20,566
643	3,093	6,149	6,697	10,588	11,277	12,564	12,798
12,886	13,610	13,855	13,963	14,066	15,333	17,808	18,624
73	207	3,773	5,054	6,415	11,727	12,283	12,878
13,112	13,227	13,414	13,685	13,967	20,951	7,389	8,080
1,387	11,484	14,257	14,273	14,495	14,556	14,724	19,898
1,598	5,651	7,390	7,594	8,810	9,318	12,275	12,670
12,988	14,871	14,908	15,036	15,046	15,047	15,059	15,264
15,469	15,671	16,483	18,765	541	1,611	3,132	

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Contents.

Notices.

The Yearly Subscription—payable in advance—including home postage, is 10s. Cheques and Post Office-Orders to be made payable to H. & R. T. Lord, 10, Ann Place, Little Horton Lane, Bradford, Yorkshire.

The Publishers will be happy to receive intimations of New Inventions, Patents, &c.

The Publishers are open to receive, from Designers, Original Designs of Carpets, Damasks, Tapestries, Linen, Cretonnes, &c., and such as are accepted will be published with the Designer's name affixed. All Designs sent for approval must be 10 inches long by 7 inches wide for single page, and for double page, 16 inches by 10 inches, and must be accompanied by Postage Stamps sufficient to pay return Postage in case they are rejected.

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Authors are requested to retain copies of their manuscripts; rejected manuscripts cannot be returned.

To prevent any misunderstanding, all Articles sent to the *Journal of Fabrics and Textile Industries* for publication will be considered as offered *gratuitously*, unless it is stated explicitly that remuneration is expected.

Readers are invited to forward items of interest to the Trades concerned.

The Proprietors will feel greatly obliged if any of their readers, in making enquiries of, or opening accounts with, Advertisers in this paper, will kindly mention the *Journal of Fabrics and Textile Industries* as the source from whence they obtained their information.

Trade Combinations and Syndicates.

The tendency to the formation of huge Corporations in various branches of industry, which has been so apparent during the past two or three years in the United States of America, seems, in a lesser degree, to be gaining a hold in this country, judging by the action that has already been taken in the salt, chemical, and some other industries, and the rumours afloat of what is going on in connection with other trades. Much has been said in the press at home and abroad both for and against these large combinations, but whether the results accruing to the promoters and others concerned have been, and are likely to be, satisfactory, it is rather too early to judge. The outcome of their trading will be looked forward to eagerly during the next two or three years as, undoubtedly, their success or their failure will, in the future, guide those engaged in departments of industry that have not already formed these unions. One of the latest amalgamations in the United States will interest our readers, it is that of the satinet manufacturers of New England, whose idea seems to be to work the project on a minor scale as a preliminary. The manufacture of satinets constitutes a large proportion of the woollen industry of Massachusetts. There are 39 mills in the State, aggregating 152 sets of cards and 1,425 looms. The number of satinet mills in Worcester County alone is 22, representing 76 sets of cards and 786 looms. This indicates that a large proportion of the Worcester mills are small concerns, and, as a matter of fact, the equipment of many does not exceed three sets of cards. The competition amongst them is very bitter, and this has operated in the past as a serious obstacle to a profitable business. From the present outlook, it would appear that the combination is not likely to extend beyond these mills and, perhaps, a few others in the immediate vicinity, and, under the circumstances, such a consolidation of interests as would enable them all to be operated upon a harmonious basis would undoubtedly be of great advantage. Whether the competition of the remaining satinet mills in New England, not joining the association, would be sufficient to affect the benefits to be derived by combination is a question that remains to be answered. Still, the satinet manufacturers of Worcester and its vicinity have such confidence in the wisdom of their project that they are determined to make the experiment, and a committee has already begun its investigations. The plan has not yet been sufficiently developed to enable us to give our readers all the details of the proposed consolidation, but steps have been taken toward this end, and there is every reason to believe that it will, within a short time, be carried into operation. Several meetings of the manufacturers have already been held at Worcester, Mass., which is the great centre of the satinet industry of New England, and a committee has been appointed to confer with the proprietors of other mills, which have not been represented, with a view to inducing them to join the combination. Whether the benefits expected to be derived from a general consolidation of interests will be realized is, at present, a matter of uncertainty, but it seems to be the prevailing opinion that such a union of the manufacturers in the neighbourhood of Worcester alone would be followed by beneficial results. Coming to the combinations in our own country, it seems, by the rumours afloat, that a syndicate to buy up the entire tweed trade of Scotland, from Aberdeen to Dumfries, is being formed, and although as yet only in an embryo state, if it really should become a reality, it will be an enterprise of very great magnitude, and one that will take a vast amount of good management in order to be successful. Schedules have been issued to some of the leading firms, with a view of testing their willingness, or otherwise, to dispose of their businesses, and minor firms are also to be approached. Of course, before anything definite can be settled as to the amount of capital required for such an immense undertaking, estimates of the sums asked by each firm for the purchase of their mills will have to be procured, and this will take some time to arrive at. Towards the sum required, on the supposition that all or a large proportion of the manufacturers are willing to sell out, there is not only the value of the assets, but also the value of the interest in a healthy going concern to calculate. These interests will vary according to the way in which businesses have been and are conducted. In some cases, the interest in a concern will be very valuable, in others, less so, but in all cases, the interest or good-will will add immensely to the total sum required to buy up the tweed trade of Scotland. In such towns as Hawick and Galashiels, the centres of the trade, it is probable that the manufacturers will act in concert. On the supposition that the preliminary stage is passed, and an approximation is made of the amount of capital required, if the scheme is feasable, it may then be launched, and the public asked to take up the stock. In the event of the scheme being successfully floated, and all the tweed trade of Scotland transferred to the company, it is proposed that, for some years, the present manufacturers may, if willing, take part in the management of the respective works, and it must also be a part of the agreement that individuals or firms will not undertake tweed manufacturing on an independent footing. Apart from the commercial bearings of the proposal, its social influence is a matter for serious consideration. It would affect the social status of the manufacturers, and very materially the position of the factory employés. The projectors are the salt syndicate. What the tweed and other manufacturers of the West of England and Yorkshire will have to say in the matter, it is rather premature to judge, but, if the syndicate should become an accomplished fact, the latter will have to reckon more or less on competition with the former, unless this syndicate should also launch out in the Yorkshire and West of England districts, and bring the manufacturers into their fold. But large as the undertaking is sure to be in the Scotch districts, that in the English cloth producing centres would be of such magnitude that the very question of finding the capital for the venture would, we think, prove a huge failure. The general opinion of the public, outside those interested in these large syndicates, is that they are formed to work a monopoly and to secure a large dividend, by making the public pay an increased price for their goods, which the syndicates will be enabled to do, through the advantage they gain by the absence of competition. Then again, employés are, as a rule, dead against these large combinations, their opinion being that it means to them a lowering of wages and hard times. Whether these opinions are sound or not will be seen later, after the syndicates have got to work. But as to the public having to pay higher prices for their goods, the argument in favour of syndicates is that, through the saving effected in the cost of production, management, &c., by the whole of the businesses being under one head, they can sell their goods at a lower rate than under the present system of production. That this is the case, or rather that it can be done, we may instance the American Card Clothing Co., of Worcester, Mass, U.S. America, a combination of card clothing manufacturers, which company, since their amalgamation, have sold their productions cheaper than the individual firms offered their card clothing formerly, and this in face of the increased tariff, which would have warranted them in asking higher prices for their manufactures.

Dyes and Colours.

A METHOD FOR RENDERING BASIC ANILINE COLOURS SOLUBLE IN BENZENE, CARBON DISULPHIDE, &c.

The processes which have hitherto been employed for the purpose of rendering basic aniline colours soluble in benzene are based upon treatment of the colour with resin soaps. Another method, which I have used for more than a year for certain blues intended for a special industrial purpose, permits of the use of oleic acid and similar substances, or of ordinary soap. Two ways of effecting the desired change are open:—1. To commence by isolating the free base of the colour, and, after drying it, dissolve it in commercial oleic acid in the presence of alcohol, which is subsequently distilled off. The mass left behind is the oleate of the base, and is soluble in benzene. 2. To make use of a double decomposition, by heating the colouring matter with an aqueous solution of Marseilles soap. The acid of the colouring matter combines with the sodium of the soap, while the fatty acids of the latter unite with the base of the colouring matter. I have found the second of these methods to be the most convenient in practice. When the colouring matters to be treated are insoluble, or only slightly soluble, in water, it may be useful to grind them up with a little alcohol before mixing them with the soap solution. When the colours are soluble, as for example, methylene blue, this precaution becomes unnecessary, but, in any case, it is well to thoroughly mix the colour with water. The preparation of a methylene blue, soluble in benzene, may serve to show how the process is carried out. Four litres of distilled water, 32 grammes of white Marseilles soap, dried in the air, and 32 grammes of methylene blue are required. The soap is dissolved in part of the water, and the colour is ground up with the rest of it in a mortar. The two are then mixed in the cold, and the mixture is heated to the boiling point for at least half-an-hour, in a water bath, a more or less abundant lather being formed on the surface of the liquid. The vessel is then removed from the water bath and allowed to cool. On the next day, the blue is found suspended in the liquid as an insoluble precipitate, and is filtered off through a piece of linen. The separation of the colour is so complete that the liquid which passes through is only very slightly coloured. The precipitate is allowed to dry in the air and can, if required, be fused into the water bath. Its fluidity may be increased by the addition of a small quantity of oleic acid, and it can then be more easily run off into any vessel. The yield in this particular case is about 48 grammes, the equivalent of the fatty acids which have combined with the colouring base being much greater than that of the mineral acid which they have replaced. Each colouring matter has its special peculiarities, and the treatment must accordingly be modified to suit each special case. It happens, for example, in the case of light blue, that the colour remains partially dissolved in the soap solution. In order to separate it, it is only requisite to add a little hydrochloric acid to the solution. The colour thus thrown down is completely soluble in benzene. The separation by filtration or precipitation may be altogether avoided by evaporating the entire product to dryness in the water bath. The residue of sodium salts and the excess of soap do not prevent the colouring matter from dissolving in benzene, when the mass is extracted with the solvent. It is worthy of notice that the oleates formed by basic colours may be heated without danger of decomposition to 100°, either dry or in the presence of water, whilst their solutions in benzene cannot usually be heated to a temperature some degrees below the boiling point of the lather without decomposing. In the case of light blue, for example, the benzene solution is decolourized by heat, and only takes up a small part of the colour on cooling. Hence it becomes necessary to make the solution in the cold, grinding up the oleate with the benzene in a mortar. Induline blue does not behave in this manner. Its solution may be heated without fear of decomposition, and the following simple experiment may be performed with it:—When a little of the blue is placed in a test tube, together with some water, some soap, and a little benzene, it will be observed that, on heating, the layer of benzene which floats at the top becomes coloured blue, and may even attain a very deep shade. There is no doubt that, in these preparations, oleic acid can be replaced by other acids, either free or as alkaline soaps. I do not, however, think it necessary to dwell on this point. The action of soap on basic colouring matters, and the solubility of their oleates in this re-agent, explain why many colours when fixed without mordants, as for example, on wool, cannot withstand washing, especially in hot water.—*Le Moniteur de la Teinture.*

FAST BLUE ON COTTON

Messrs. Standant Bros. state that a new fast blue, intended to replace indigo blue, is obtained in the following manner:—100 kilos. of the cotton material are boiled for two hours in a bath made up of 8 kilos. of liquid extract of campeachy wood, and 10 kilos. of salt. The material is allowed to cool in the bath, removed, and passed, for a quarter of an hour, through a cold bath, containing 10 kilos. of ferrous sulphate. It is then rinsed in water, rung out, and again put into the first bath, to which 2 kilos. of wood extract, and 3 kilos. of salt have been added. Here it is heated to 30°-40° C., and allowed to remain for an hour, after which it is wrung out, and finally passed through a bath of soap and salt. After this, it is passed into the boiling colour bath, which is made up as follows:—5 kilos. of soap; 5 kilos. of salt or sodium sulphate; 1½ kilo. of colouring matter, special aniline blue. The material is worked through this bath for an hour, rinsed, wrung, and dried. In a memorandum, added on November 6th, 1889, the inventors give a receipé for the first bath, which renders their process applicable to thread and linen:—800 grammes of perchloride of iron; 5 kilos. bichromate of soda; 3 kilos. sulphuric acid; 7½ kilos. hydrochloric acid; 2½ kilos. aniline oil. Work for two hours, and afterwards rinse well with water. Messrs. Standant also state that this third bath may be made up with 2% of blue vitriol.

A German contemporary gives the following composition for producing a soft silk-like finish on cotton goods:—For 100 litres of composition use 2½ kilos. of shellac, 5½ kilos. of dextrine, 750 grammes of lard, 400 grammes of soap, 300 grammes of spermaceti, and 300 grammes of white wax.

A NEW YELLOW.

A new yellow colouring matter, made from toluylenediamine, oxalic acid, glycerine, and chloride of zinc, has been patented in France. It dyes wool and silk, in acid baths, a fine yellow, with a green fluorescence, while cotton, mordanted with tannin, is dyed an intense yellow.

NEW MILLING YELLOW DYE.

Messrs. L. Cassella and Co., Frankfurt a. Maine, have recently introduced a new colour, milling yellow. For dyeing on wool, milling yellow may be used either as a self-colour or in mixtures. Used as a self-colour, it produces a pure, deep, yellow, which is equal to fustic or flavin as regards fastness to milling, and with regard to fastness to light, it surpasses both by far. At the recent Exhibition of Army Requirements in Cologne, there was exhibited some cloth for army purposes, dyed with milling yellow, side by side with cloth dyed with flavin, as prescribed hitherto by the military authorities. The flavin faded, showing a dirty yellow colour, after an exposure to light for a few weeks, milling yellow, on the contrary, retained all its brightness, even after months. The dye penetrates heavy fabrics, and dyes quite evenly, if a little is taken. It can also be used in mixtures, and for shading other colours fast to milling; it can be dyed like alizarine colours on a chrome-mordant, as well as in an acid-bath, as usual. These remarks apply to wool and silk alike. Milling yellow is fairly fast to acids, and stands sulphurous acid (stoving) well. If used as a self-colour, it may be dyed on wool with acetic acid, Glaubers' salt, sulphuric acid, or bisulphite of soda. It possesses the property of going on to the fibre slowly or quickly, according to the quantity of acid used. It will dye very quickly with 10 % bisulphite of soda, but if the goods require to be treated carefully, it answers better to start with 2 to 3 % turning frequently and heating slowly, then to add another 2 to 3 % bisulphite of soda, in case the bath is not sufficiently exhausted in half-an-hour. In cloth dyeing, the best results are obtained by first cooling for one hour, with 10 % acetic acid, and then adding the colouring matter. Silk is dyed with acetic acid or, as more usual, in boiled off liquor acidulated with acetic acid. Its extreme fastness renders milling yellow, also, of great importance for printing woollen fabrics and slubbing, both as a self-colour and in mixtures. The dyestuff can easily be fixed, so as to be a fast colour, without the use of chloride. The following proportions give good results:—20 lbs. thickening; 2 lbs. milling yellow O; 8 lbs. water; mix well, heat, and, after cooling, add 4 lbs. acetic acid.

PRODUCING RED DESIGNS ON AN INDIGO GROUND.

The large demand for cotton fabrics, with designs in which navy blue associated with red predominates, has led colour chemists to pay attention to the means of producing similar effects with various colouring matters. As far as concerns certain colours, the problem has found its solution in the process by which an aluminium mordant is added to the discharges which are used to produce white designs on an indigo ground, and then dyeing with alizarine. It appears, however, that up to the present time, no method has been found by which indigo can be discharged and, at the same time, printed with Turkey red. Hitherto, the so-called albuminous colours, *i.e.*, vermilion and red lakes, have been used in combination with the well-known discharges. J. Mullems (Färber-Zeitung, 1889, p. 97), has recently succeeded in producing the red colour directly on the fabric, by employing a method based upon re-actions already known, but which have not hitherto been employed for this purpose. The discharge of the indigo is effected by the oxidizing action of alkaline potassium ferricyanide. This salt passes into ferrocyanide with loss of oxygen, which, in the nascent state, destroys the blue colour. If the colours derived from benzene and toluine, which are fixed by cotton without the aid of mordants, could withstand the action of concentrated alkalies, it will readily be understood that they would furnish a means of obtaining discharge patterns in various colours. Mullems remedies their lack of stability, in this respect, by the use of silicate of sodium, instead of caustic soda. Commercial silicate of sodium has not, however, given good results. In order to obtain a permanent and light shade of benzo-purpurine or Congo red, the silicate must be chemically pure—that is to say, it must not contain an excess of caustic soda, and must be in the state of very fine powder. If alkalies

are present, the change of potassium ferricyanide (red prussiate) to ferrocyanide (yellow prussiate) takes place at the ordinary temperature, whereas this change is not required to take place until after the printing. It is, therefore, obvious that the silicate of sodium must not be in solution when it is applied to the fabric.

The proportions to be employed are :—

Benzo-purpurine, or Congo red.....	grammes	42
British gum.....	,,	210
Water	,,	488
Ferricyanide of potassium.....	,,	260

The mixture is boiled, and, after cooling, made up with water to 1000 grammes. Just before printing, 176 grammes of powdered silicate of sodium are introduced, and the whole filtered. After printing, the tissue is exposed for an hour to steam (at 100° C.), then to the air, and is finally washed with warm water (40-50° C.) and soap. This last washing is essential to the production of a bright and rigorous red. Knowing that ammoniacal salts are disassociated by steam with formation of ammonia, it has been proposed to use chloride of ammonium, in the hope that the alkali, thus rendered free, would effect the change of ferricyanide into ferrocyanide. It has, however, been found that the blue cannot be discharged in this way. The author has obtained satisfactory results by employing powdered stannate of sodium, instead of silicate, whilst he has failed in every attempt to make use of the liquid and silicate of commerce.—*Moniteur de la Teinture.*

EXAMINING COLOURS STATED TO BE FAST TOWARDS LIME AND SUNLIGHT.

By H. STÖSSEL.

Many so-called aniline lakes, *i.e.*, mineral substances upon which aniline colours have been precipitated and fixed, have recently come into the market. These body-colours, which are usually of brilliant shades, are credited by the small manufacturers with many properties which they do not by any means possess, and the purchasers are thus frequently deceived. One of the most important of these is their resistance to the action of alkalies, and another, their permanence towards light, and especially sunlight. Both these properties are of exceptional importance for these colours, which are chiefly used for wall decoration, distempering, carpets, and coloured papers, and it, therefore, appears admissable to lay down, as far as possible, definite rules for testing the various colours in question. I would, therefore, recommend the following method, which proves to be simple and practically convenient :—To test the stability of the colour towards alkali, it is best to use normal caustic soda solution (Sp. gr. 1·046 at 15° C.), allowing 10 c.c. of this solution to act on one grm. of the colour for six hours, after shaking up the whole. At the end of this period, any colour which cannot resist lime is, if not entirely destroyed, at all events, considerably weakened. A comparative test should be made with a sugar solution of the same specific gravity, under exactly the same conditions. A comparison of the two samples at the end of the six hours will lead to the detection of the least alteration in shade. Although milk of lime, as usually employed, is always much more strongly basic than normal caustic soda solution (one sample was four times as strongly alkaline), it is quite unnecessary to employ such a strong solution for the test, since all colours which ought to be excluded from the uses named above are attached by normal caustic soda. To test the stability of the colour towards light, it is spread out on a plate, one portion being exposed to the sunlight, and the other protected by a piece of opaque paper, the whole being covered by a glass plate. If the colour is at all fugitive, a distinct difference will be perceptible between the exposed and unexposed portions after six hours. This simple experiment is quite sufficient to determine whether the supposed "light proof" colour can actually claim the title.—*Chem. Zeit.*

The Mordanting of Wool.

Dr. Adolphe Lehne, director of the chemical examining station of the German woollen manufacturers, delivered a lecture at a recent convention of the manufacturers, from which the following extracts are made :—"When the first aniline colours entered into commerce, about 1860, they attracted great attention by reason of their beauty, as well as by the great ease with which they were absorbed by the animal fibre. The laboriously and gradually accumulated experience of the tinctorial art appeared to be entirely superseded by the newly discovered agent. A gradual heating of the wool in the solution of the aniline dyestuff sufficed to absorb the colour and to dye the wool evenly. Soon, however, the fact became clear that the great instability of the first aniline dyes against the effects of air, washing, and fulling, prevented their use entirely for dyeing a fast colour on wool. As late as 1883, when the aniline industry had been developed to its highest point, these colours were used either not at all or only to a very small extent, in the first-class cloth and cassimere mills. This condition of affairs has been changed somewhat, however, and many of the old reliable pigments for wool, such as madder, sanders, cudbear, camwood, and even indigo, have been replaced, either partly or wholly, by aniline colours. There is very little doubt, however, that the time is not far distant when the victory of the anilines over the time-honoured wood colours will be complete, to judge from the great progress which is now being made in this direction. Their success, however, only dates from the time when the aniline dye manufacturers began to recognize the many and varied demands made of these colours by the wool dyer who is forced to employ a fast colour. They also saw that, although a dyestuff may be fast against light and milling, and bright of hue, it is, nevertheless, useless, should it bleed in fulling, or change its shade. When, to-day, we glance over the long list of fast colours used in dyeing wool, we find that all the dye-stuffs, both natural and artificial, with the single exception of indigo, depend entirely upon the employment of a mordant. The German word *beize* (corrosive), as well as the French *mordant*, and the English *mordant*, are, according to Hummel, used on the erroneous supposition, formerly held, that, by the corrosive quality of the mordant, the textile fibre was etched, or partially corroded, in consequence of which the enlarged surface became more capable of absorbing the dyestuff. Hermbstadt, in 1802, sought for a more suitable word to designate mordants, and proposed to call them absorbents, because, by their mutual affinity for dyestuff and textile fibre, they effected the desired combination—performing a role which the chemistry of those days designated as an absorbing affinity. To-day, we know that the effectiveness of the wool mordant is to be traced to its acton upon the essential constituents of this fibre to soluble metallic salts. When the wool is boiled with the solution of such a metallic salt, which is generally mixed with an acid, then, as Chevreul was the first to show, the salt is dissociated by the fibre, and an insoluble combination of the corresponding metal is fixed upon the wool. This insoluble metal combination, again, is capable of absorbing certain dyestuffs in the subsequent process of dyeing, and with them forms a new chemical combination, with new properties—the so-called colour lakes. Accordingly, all wool mordants act only by their capacity for depositing the fibre on insoluble metal combination, suitable for forming a colour lake. In these colour lakes, the dyestuff performs the role of an acid to the corresponding metal. When, for instance, a solution of chloride of iron is heated, together with a solution of alizarine, in soda lye, a reciprocal dissociation occurs. The iron unites with the alizarine, and forms a deep violet alizarine iron lake. The chlorine combines with the soda, and becomes chloride of sodium (salt). The alizarine iron lake being insoluble, it deposits as a flaky precipitate. After filtering, drying, and grinding, it appears as a dark violet powder. In a similar manner may be formed the red aluminum lake, with sulphate of alumina. The brown red chrome, or copper lakes, are formed with sulphate of chrome or copper, and the fiery scarlet tin lake of the alizarine, with tin salt. When we investigate the properties of these single colour lakes more closely, we shall find that they coincide in essential points with those formed upon the fibre. The chrome and copper lakes of the alizarine are barely changed by the treatment with a hot solution of soda and soap. They are insoluble in it. The alumina lake, however, is attacked and becomes bluer and duller. The solution becomes coloured. The iron lake is already dissociated by dilute mineral acids, and precipitates alizarine. The tin lake, also, is distinguised by its inconstancy toward alkalies. The relations between fastness of colour and the nature of the metallic mordant are very close with all mordants. Haematein, the dye principle of logwood, which, besides alizarine, is a mordant dyestuff most in use, also forms lakes with alumina and tin that are less fast against alkali, and with iron those which are less fast against acids than with copper or chrome. Colour lakes are produced wholesale in a manner similar to that which has been described, and their colour being generally very intense, they are usually toned down with white bodies, such as alumina, gypsum, barytes, &c. The dyer can compose very similar colour lakes, as well as the manufacturer of pigments, upon his wool, which are substituted in this instance for the white toning down agents. But the dyer must, in order to prevent a precipitation of the insoluble lake outside the fibre, or an action of the acid necessary for mordanting upon the dyestuff, permit the formation of the colour lake to proceed in such a manner that the mordanting is performed in separate operations, that is, that he prepares the wool with the lake-forming metallic combination, and then dyes. Whether there exists a complicated chemical affinity between the colour lake and the wool, which may serve as explanation of their intimate cohesion, or whether the colour lakes are, similar to indigo, only separated in a highly pulverized condition and retained upon the fibre by surface attraction, it is almost impossible to decide, at least as long as the composition of the wool itself is not better known. When, therefore, the dyeing with mordant dyestuffs is based upon the formation of new chemical combinations, the conclusion may be drawn that, for mordant dyestuffs, only dyes of a well determined chemical composition can be suitable. This is, indeed, the case. Hummel distinguishes between mono- and poly-genetic dyestuffs. By the first, he understands those which, like archil, fuchsine, methyl violet, &c., are suitable for the production of one colour only, although of different shades, while, with poly-genetic dyestuffs, he designates those that furnish several colours, in depending upon the mordant employed. The mono-genetic fuchsine only dyes red, methyl violet only violet. With the poly-genetic alizarine, however, as we have already seen, may be produced scarlet, Bordeaux, brown, and blue violet. Though the word "poly-genetic" may be appropriate, the words "mordant dyestuff" will be more readily accepted in practice, because the dyer understands at once what is meant. A very great variety of shades may be produced with the mordant dyestuffs by the use of different mordants. . . . . With six natural and nine

artificial dyestuffs, by using seven different mordants, there are in all 105 tones, varying from each other in shade, fastness, &c. By mixing the mordants or dyestuffs, and altering the proportions of the latter, innumerable combinations may be produced. In the choice of mordants, it may be stated that the single metal mordants, which have shown their practical value, are used most. They are pure alum, tin, chrome, iron, and copper, also the mixtures of chrome and copper, and iron and copper. In the mordanting with alum or chrome, the corresponding dyestuff is fixed upon the fibre as aluminum or as chrome lake, while with the mixed mordants, for instance, chrome and copper, a mixture of chrome and copper lake is produced. The greater number of the mordant dyestuffs also form colour lakes with bicarbonate of lime and other lime salts. These colour lakes, however, are mostly dull and of little account. The injurious influence exerted by hard, calcareous water, in the dyeing of mordant dyestuffs, is invariably to be traced to the formation of these inferior lime lakes. For alizarine colours, an addition of from one to two quarts acetic acid, per 1,000 quarts water, is sufficient to prevent the formation of these injurious lime lakes. The acetic acid keeps the lime in suspension as an acetate. For logwood and other dyes, a special purification of the water is to be preferred, because acetic acid largely prevents the extraction of the logwood. An answer to the question, Which mordant is the most suitable for a dyestuff? can be given only after a full series of systematic experiments. It is incorrect to designate one mordant dyestuff as fast and another as fugitive. Haematein furnishes shades, when dyed upon copper and iron mordant, that are distinguished by their fastness to fulling and weaving. The pure chrome or aluminum lakes, however, show little resistance to light. Alizarine, dyed on chrome and copper mordant, produces colours that resist a strong fulling excellently, while a pure chrome lake does not resist fulling. The aluminum lake can only be used with extreme care for goods to be fulled, while a tin lake is utterly useless. Strictly speaking, therefore, one can speak only of a fast colour lake, but not of a fast mordant dyestuff."

(To be continued.)

The Ventilation of Cotton Mills.

By J. D. Sutcliffe, of The Blackman Ventilating Co.

CARDROOM.

Much depends on how the cards have been placed in the room. Undoubtedly, the best position for successful ventilation is to have the cards two or three rows deep, on one side of the room only. Then the air should be admitted on the opposite side, and small fans, say 2ft. in diameter, in the windows on the same side as the cards. The air is first drawn over the preparing machinery, then over the cards, and, finally, out through the fans. This prevents the dust flying about, and much cleaner yarn is produced. Workpeople also receive benefit. If carding machines are placed on each side of the room, the best way of clearing the building is to fix the fans at one end, run a tube of large diameter from each fan down the back, or last, row of cards, and draw the dust along it, direct to a fan at its end, through bell-mouthed openings formed on the tube. This is not so satisfactory nor so sightly as fixing the fans in the windows, but, in the case just mentioned, it is the only effectual way. Of course, the air would only travel over the cards on the side of the room at which it came in.

SPINNING AND THROSTLE ROOMS.

There is always a difficulty in ventilating spinning rooms, especially where fine counts are spun. Practical spinners assert that a high temperature is really necessary, but a good deal of this statement is prejudice. I have in my mind a Rochdale firm, who determined, at any cost, to reduce their temperature, and who now say they can spin as well at 65 deg. as they could at 85 deg., and they are usually engaged on 60's counts. Ring spinning rooms suffer most from the heat. Last February, I was in one room containing 35,000 spindles, and when the outside temperature was at 45 deg. F., the temperature in the room reached 98 deg. F. This excess of heat was caused solely by the speed of the machinery, as they had no artificial heat in the room. I found it necessary, in this instance, to fix four 2ft. fans down one side of the room to exhaust the hot air, and one 3ft. fan, used to blow the air into the room along a duct with perforated sides, and no draught was felt. Throstle rooms are also troubled with high temperature, but they present little difficulty, the workers being mostly engaged on coarse counts. When the rooms are top rooms, the best method is to fix the fans in the ceiling at the centre, and admit the air on all sides. If the room be in a middle storey, however, then the air must be admitted on one side, and the fan or fans fixed opposite. It is sufficient to use fans capable of changing all the air in the spinning room every fifteen or twenty minutes, and, if the temperature be not very high, every thirty or forty minutes will be sufficient.

GASSING ROOMS.

These are generally the most unhealthy rooms in the cotton trade, but I have seen instances where, with proper attention, the room was as clear and fresh as any other about the mill. A gassing room should always be placed on the top floor, and factory inspectors should sternly insist upon this arrangement, as, otherwise, a perfect distribution of air inlets cannot be made. When I assert that it is necessary to change all the air in the room once a minute, and this without draught, it will be easily understood why this condition is essential. The fans should be of medium size—I have found the 3ft. the best for most rooms—and should be fixed well up in the roof, although, I think it is a mistake to build a gassing room too high. I believe 10 feet to the eaves, with an ordinary pitched roof, is high enough, because, if the room is too high, you have more air to deal with, and would require more fans to change the air the same number of times. A sufficient number of fans must be used to change the whole of the atmosphere in the room every minute, and the air admitted, first, through the wall, which should be clear of any other building on two sides at least, and, second, inlets should be made under the gassing frames, and come through the floor. This arrangement was, I believe, first designed by a Bolton Factory Inspector. I cannot help thinking, by the way, that if manufacturers and millowners would look upon the factory inspectors as their friends rather than their enemies, and consult them on sanitary and other matters, they could gather many useful hints from the very varied experience of these gentlemen. To go back to the inlets first mentioned, I improved them by placing pieces on the sides to prevent dust being swept into the room below, and also by fixing perforated zinc in the sides, which breaks up the current of air and gives a better distribution. With this system of air inlets running all the way under the frames, not the slightest draught is felt, and the lights are never affected. If you compare, for a moment, a current of air and a current of water, you will understand why, if a current is running down a narrow channel, it runs quickly, but, directly the same volume of air or water is given greater space, the speed of the current is slower and less perceptible. This is the reason why the air inlets should be plentiful and well distributed.

WINDING ROOMS.

In the winding room, the speed of machinery is very moderate, and the air is always fresh enough, but the fluff and dust thrown off some kinds of work is very considerable, and it should be the aim to remove as much dust as possible, with a minimum amount of air. This is very difficult to accomplish, as I have always felt when asked to advise on the ventilation of these rooms. Most of the modern winding rooms are lighted from the top. If the inlets for air are made under the windows, and the air is admitted to a coil of steam pipes, and thence taken over these to the fans, which should be fixed low down in the room, say at the level of the tie beam, no inconvenience will be felt. I would not, however, use more fans than would change the air in the room every forty minutes.

SIZING ROOMS.

Results have varied so widely, and so many ideas as to the form of trunks best suited for removing steam from taping frames have been expressed to me that I have some difficulty in forming a decided opinion as to which is best. I find that, at one place, a certain shaped trunk is all that is necessary to carry off the steam, whilst, at another, exactly the same form is a downright failure. Where the trunks alone are depended upon, I would lay down three important conditions:—First, have the spars under the slates boarded, and, in case of a new room being built, have a lining of tarred felt under the slate. Second, run the trunk from the cylinders into the trunk from the size box. Third, contract the mouth of the trunk immediately over the size box, and, if these do not make a perfect job, then add steam pipes in the roof as near the boarded ceiling as practicable. The result of the first of these conditions is that the roof is kept warm and condensation is prevented. It has been thought in times past that you could not have a taping-room in too exposed a condition, or the roof too open, and I have known some places even covered with open slating "to allow the steam to go out." You might as well talk of getting steam through the keyhole as through any open slating. The result of the second condition is that the heat from the cylinder causes a strong upward current of air in the trunk from the size box, which greatly assists the steam in getting away, whilst, if the two trunks are taken out of the room separately, the heat from the cylinder is wasted. When the third condition is complied with, the contraction of the orifice leading to the trunk causes the steam to travel quicker, and it can also be brought much nearer to the size box than with a bell-mouthed trunk. But it is the result of my experience with mechanical ventilators that are likely to be most useful, and I have never yet seen a sizing-room —no matter how bad it has been—where fans properly applied could not make it as good as the best. If I were building a new sizing-room, I would use no trunks whatever, no matter how many machines were required in it. But to do this successfully, it is essential that the roof is under-boarded and in one span, with a moderately quick pitch of, say, 45 degrees. Then a 3ft. fan, fixed between every two machines, would keep the room perfectly clear of steam. These conditions can rarely be fulfilled in the present taping-rooms, and the best must be made of them as they are. When there is only one machine, I recommend, as a rule, the fixing of a 24in. fan in the trunk, directly over the size box, and, if this is well done, success is certain. If there are two or three machines, a 3ft. fan should be fixed at the extreme end of a horizontal trunk, and the trunks from each cylinder and from each size box should be led into it. The 3ft. fan is large enough for three frames, but four would require a 4ft. fan, to be certain in result. The chief cause of failure in applying

fans to sizing rooms is that cold air is allowed to rush into the room, taking the place of the air extracted by the fans, and, when it comes in through openings in the roof, it is bound to have the effect of rapidly cooling the room and condensing every particle of vapour with which it comes into contact. If the air can be drawn from a warm room, say an engine-house, the fans in the tape room would be well supplied, and the warm room would also be the better for it. But, in any case, air must not be admitted at the slates, or success cannot be attained.

WEAVING SHEDS.

I take it for granted that a certain amount of moisture in the shed is necessary, but it should be the manufacturers aim to give the cloth the maximum share and the workpeople the minimum. The greatest difficulty experienced in using steam from the sizing rooms for moistening the shed is that the rooms are nearly always several storeys away. I saw a mill in Blackburn, some time ago, where the sizing room was in one corner of the weaving shed, partitioned off to hold the machines, and the owner had arranged pipes from the sides of the trunks, over the size boxes, that led into the shed. Of course, the steam travelled along these horizontal pipes, at different speeds, according to the weather outside. If the day was fine, warm, and dry, out the steam went through the vertical trunk to the outside, but if it happened to be a dull, wet day, the shed was moist enough, then the steam positively refused to go outside, and filled the shed, so that it was like a dyehouse. A satisfactory result could not be obtained one day out of twenty, and the effects of too much steam and condensation were that numbers of workpeople suffered from rheumatism. Finally, the plan had to be abandoned. In another case, the sizing room was at one end of the shed, cans being fixed at the other end, and the steam followed with the air to the fans, producing a fairly satisfactory result. The only fault found was that the distribution of the steam was unequal. Personally, I should object to having my head in a hot vapour bath and my feet in cold water, an event which is always sure to happen as soon as the steam reaches the floor. It condenses there, and forms pools of water. This, to a large extent, might be obviated, if lathed standing boards were provided for the workpeople, at any rate, so far as keeping their feet dry is concerned. I think a good and simple plan is to run a small steam pipe, say an inch in diameter, against the wall, about six feet and a half from the floor, carry it round the shed, and make suitable openings for the admission of air. Over each of these openings, fix, in the steam pipe, an ordinary muzzle, to eject steam. The current of air mixing with this would be carried to small fans fixed down the centre of the shed. These fans should be run at different speeds to suit the temperature required, and of sufficient capacity to change the air every fifteen minutes when necessary. This would ensure a good supply of fresh air mixed with steam, and the results would certainly be better than they are now, with the system of blowing in the steam just over the workpeople's heads, and with all the outlets stopped up. I have had suggested to me another arrangement, which I intend to try on the first opportunity that presents itself. This is, to use very small fans, attached to steam coils and moistening apparatus, at different points under the floor, with very small connections to each loom. Each operator will have control of the amount of water evaporated, and the action would start and stop with the occasion for it. If this were perfected, the extra moisture might really never get abroad, but be absorbed and retained by cloth as woven. In concluding, I would urge upon spinners and manufacturers the importance of always providing plenty of fresh inlets, and, the more steam they use the more this caution is necessary. Then again, in the winter time, when so much gas is burned, the atmosphere of many sheds is intolerable, and it would be a very great boon if fans were run simply during, or before, the usual meal hours, so that the workpeople came back to a clear and pure atmosphere. Again, in the evening, as soon as the gas is lighted, the same process could be gone through. Cotton spinners and manufacturers, I trust, are learning the fact that, if they want best results out of their workpeople, they will have to supply them with plenty of fresh air, which is as necessary as good food, if the health is to be maintained at a high standard.

Cotton Flannels.

The preparing of cotton for cotton flannels, says a contemporary, must receive the greatest care to insure success. An even blending of the warp and weft is essential to procure an even nap on the cloth. There is quite a difference of opinion among weavers with regard to the condition of the cloth raising when sent to the raising room. The process of raising is not only a very peculiar one, but it is very severe on the cloth as well. Each yard of cloth must stand on its own merits during the process. There is the same strain brought to bear upon one square foot of cloth that there is upon another. It will, therefore, be seen by those interested, how necessary it is for the cloth to be even. When the fact is taken into consideration that the fabric passes under the steel clothing of four, five, and often six, machines, it is evident that it must be even and well woven to stand the test and come through all right as a first class flannel. We can see why it pays to buy good grades of cotton, as well as to carefully oversee the mixing, carding, spinning, and weaving, so that a good cloth is sent to the raising room. Of course, there is a possibility of doing considerable damage in the processes by too much friction. Then, again, if the card clothing is not in proper condition, the cloth will suffer beyond redemption, and will either have to be thrown away or put into a lower grade of goods. Cloth well milled and carefully handled at the processes of napping will present a beautiful, soft, nap. Several years ago, there was quite an animated discussion with regard to the merits of steel card clothing for raising machines. I was more than usually interested in the subject, because I had heard so many express adverse opinions as to the policy of ever attempting to use it. Since that time, I have been looking for the results that many objectors presented as good and sufficient reasons why steel wire should not be used. It was a question that was debated with great vigour, and there was much doubt as to whether it could be successfully used with safety, but I think I have been thoroughly convinced that hardened and tempered cast steel wire, as has now been introduced in these processes, will take the lead of all other wires, both for cards and nappers, and this brings me to the point that has not yet been spoken of. There probably is not a harder and more trying place for card clothing than on raising machines, for the strain that is brought to bear on the wire far exceeds that on all other machines. I presume woollen cards will approach nearest to them in this respect. The grade of cloth to be raised has a good deal to do with the durability of the wire. Cloth of the weight of two yards to the pound will put the wire under a much greater strain than cloth of the weight of four yards to the pound. The number and setting of wire has to be taken into account when clothing is being ordered. There has always been one serious difficulty in using Bessemer wire, and that was the very narrow margin card makers had in setting wire. That is to say, No. 33 wire was as far as they dared to go on account of its being weak and not able to stand up to the strain. On the other hand, too coarse numbers would not work well, and so the limit either way was very close. The breaking out of napping wire has necessitated a large expense in replacing the clothing, but, as there was no alternative, manufacturers have kept on in the same direction for years. It seems, however, that we have now reached the last mile-stone in the use of common wire for raising cloth, from the fact that tempered steel wire is now being introduced into all the departments where cloth is being raised. There has been great reluctance on the part of very many of our manufacturers in adopting this new method, especially for cotton cloth. What was feared the most was the risk of fires. Another reason has been advanced by some of the shrewdest managers, and that is that steel wire, instead of drawing out the cotton fibres and leaving a soft nap, would cut the fibres by reason of the sharpness of the teeth. But these results have not been realized as was anticipated, for no fires have occurred, and so far from the cloth having been injured by the steel wire, it has actually done its work better than by the old method, and hardened and tempered cast steel wire is now extensively used in preference to common wire. * * * * As previously stated, there was a very narrow margin on wire, when the common kind was put on. Nothing finer than No. 33 could be used to advantage, and that was why steel wire was eventually substituted for iron wire. It was found that No. 35 steel wire would stand up and do most excellent work, especially where a light grade of goods was being napped. Less friction was required to perform the work. At the same time, the cloth was left in a much better condition, with a fine, even, flossy nap drawn out. The process of raising cotton goods is one that requires great care, for the least deviation in the friction or strain is liable to spoil the cloth. The first process simply starts the fibres from the thread. Passing to the other machines, the raising is continued until finished. It has been found that, by the use of steel wire, a better nap can be produced both on heavy and light grades of goods. In setting steel wire for raising machines, the bend should be less than on regular wire, for there is less give when they are brought to bear on the cloth. Some prefer an open space in the setting, but the usual way is to set them in solid sheets, with wire considerably shorter than the regular card clothing. The clothing, in order to insure the best results, should be drawn quite loose compared with card clothing on cotton or woollen cards. This will be found an actual necessity from the fact that a severe strain is brought to bear on the cloth. This is especially noticeable on light flannels. The number of points to the square inch is a matter of opinion, although the best theory now advocated is to leave them a shade open. One leading firm uses No. 32 wire with 34,000 points. No. 33 wire, at another place, runs from 46,000 to 48,000, while with steel wire, No. 35, the setting is from 55,000 up to 60,000 points. Another point on which I wish to speak is grinding. I am of the opinion that steel wire must be handled very carefully when ground. In fact, we cannot go too far in this direction. A very slight grinding is all that is necessary. Just enough to take off the roughness. Steel wire will have to receive more care in setting than Bessemer steel. This is evident from the fact that hardened and tempered cast steel wire is not so elastic, and stands up to its work, and takes hold of the fibres more readily. What we want is that the wire shall be in such a condition, as far as the points are concerned, that, after taking hold of the cloth, they will let go without any tear on the fibres. Very much depends upon the condition of the cloth, but if it is evenly milled, and the clothing is in good trim, with machines running steadily, there is no reason why a fine grade of cotton flannel should not be produced.

It is well known that the rates of insurance charged by first class offices for the insurance of woollen mills are very high, and owners of such mills are cautious as to covering their risks at home. In the Russian mill districts, several mill proprietors have recognised the value of a perfectly guaranteed insurance, and as the fire offices will not accept risks, except at prohibitory premiums, unless a proper system of fire protection exists, the owners of mills in Russian Poland are considering the provisions of efficient and simple means for the extinguishing of fire, and Messrs. Pozanski, owners of some of the largest mills in Lodz, have purchased two of Messrs Merryweather's "Greenwich" pattern engines, capable of pumping 750 and 400 gallons per minute, respectively, and a similar engine has been ordered for the mills of Messrs. Schriebler of the same town. It is evident that owners of mills would do well to consider whether the adoption of suitable appliances would not be a good investment, as it reduces their annual account for insurance, besides securing them from the loss that inevitably follows a large fire.

Original Designs.

On our first plate will be found a design for Silk Goods, drawn by Mr. R. T. Lord.

* * * * *

Our second contains suggestions for a Printed Blind.

* * * * *

The third plate gives a pattern for a Printed Handkerchief, in linen, cotton, or silk. This has been designed by Mr. R. T. Lord.

Monthly Trade Reports.

WOOL.—A falling off in the demand for wools has taken place during the month, but stocks on hand are not large, hence, prices have kept moderately firm, with a slight weakening tendency. The finer qualities of English wools have had a fair demand, but strong sorts have been neglected, with a consequent decline in values. Colonial wools have sold but moderately. There has been a decided decline in the various classes of yarns, especially for the export trade. The orders offered have not suited spinners, prices having ruled low, but, where old contracts are running out, there is a giving way in rates in order to ensure work. The home trade has been brighter than the export, but still, in this branch, spinners have not kept fully employed. The piece trade has been in a fair condition, but new orders have only come in slowly. A fairly good business has been done for America in the finer classes of goods, but merchants generally are waiting to see the effect of the tariff during the next few weeks. Sample orders for mohair and alpaca goods have been rather freely offered by American houses. The Continental trade has been of a dragging character. Prices keep moderately firm.

LACE.—There is little change to note in the lace trade. In antique laces, a fair number of orders has been booked, and the same may be said of the cheap kinds of Maltese, Torchon, and Brabant goods. In the net branches, quietness has prevailed. A fair amount of business has been done in curtains, and such like goods. The American tariff, so far, has not acted prejudicially upon the lace trade, but makers of curtains, especially, are anxious as to the effect it may have upon their manufactures.

LINEN.—An improved demand has been experienced in the linen trade, with, perhaps, the exception of fancy damask table covers and such like goods. Linen sheeting, bed fabrics, and fine drills have sold rather freely, and stocks on hand have been reduced, and more looms set to work. Tea cloths, toilet covers, dairy and cheese fabrics have sold up to an average. Towels in fancy designs have also met an improved demand. Some of the patterns of these are admirable specimens of designers' and weavers' work. The United States tariff does not seem to have affected business to any great extent, and the general opinion is that, for some time to come, the demand for America will keep up to the average of the past few years.

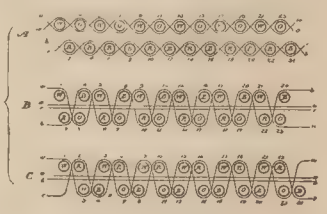
WOOLLEN.—This branch of industry has not been so cheerful as usual during the past month, although machinery has been generally fully employed. Still, orders have not come in with the regularity that has been the case during the past few seasons. Spring repeats have been fewer than usual, and it is getting late for these to be numerous. Serges are having a still better demand than we have reported recently, although these reports have been decidedly favourable to the makers of this class of cloth. The patterns, as regards design, colouring, and general effect, now being offered are admirable in every respect, and such as are likely to bring large orders. The outlook for makers of serges is decidedly cheerful, and the run of these is likely to last for some time, judging by the favour accorded to them by the general public. The finer classes of worsteds have sold fairly well, but have not brought as large orders as was the case a few months ago. With the exception of those for the ready made clothing business, tweeds have shewn a falling off in demand, and prices have had a lowering tendency. Other descriptions of fabrics have kept firm.

COTTON.—The month of October was not productive of very heavy business in any branch of the cotton trade, but the orders generally on hand have been such as to keep up rates. Spinners who are well supplied with old orders have not troubled themselves much about new contracts, preferring to wait until their present engagements were nearer a close before making many new ones. Wefts are dear, and supplies are not always in line with demand. Egyptian yarns have also kept remarkably firm, and there is greater pressure for delivery of Bolton counts, usually with ample margins, than has been known for years. Bundles for China and Japan have not sold freely, and orders in some spinnings are rapidly approaching completion, but, so far, no particular anxiety to sell has been apparent. For the latter market, an average trade in two-fold 32's and 42's has been arranged, and makers of these counts are well engaged. Spinners of India staples are also under order, and no signs of giving way are shown by the sellers of favourite marks. Continental buyers have taken about their proportion, and their purchases have frequently been made to extend over distant dates, with defined conditions of delivery. In cloth, the weakest position has been amongst makers of low shirtings and printers, and in Burnley, Darwen, and Haslingden, complaints have been frequent as to the difficulty of selling at prices that bore any equitable relation to cost. Finishing and bleaching goods have sold well, and for Egypt, South America, and the smaller European markets, good returns are recorded. Home trade houses have purchased moderately, and instructions against contracts are, perhaps, more liberal than usual. Light goods, such as jacconets, mulls, or dhooties, have kept moving, but the business proferred has not been excessive.

New Patented Fabrics.

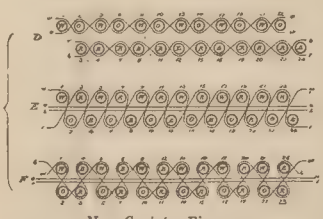
NEW CARPETS.

Two new carpet fabrics have recently been patented. The following claim is made for a two-ply ingrain fabric:—The embodying a solid weave, in which each surface is made up of pairs of successively thrown weft threads, and in which adjacent binding warp threads loop, respectively, the one forward and the other backward, over the successive weft threads of the face, and the first backward and the second forward under the successive weft threads of the back, and in which warp threads lie along the centre of the fabric.



New Carpet. Fig. 1.

The following is claimed for the second fabric:—The method of producing improved colour effects and an improved fabric structure in two-ply ingrain carpet fabrics, which consists in employing four or more differently coloured weft threads, and introducing the same in the following order:—two successively belonging to one ply, and then two successively belonging to the other ply; employing warps in four divisions, two for each ply, and raising the same in the following order for the formation of the plies, the two divisions for one ply successively, then the two divisions for the other ply successively, and manipulating the warps for the production of the pattern in the following order, the warps of one ply twice successively, and then the warps of the other ply twice successively, and employing a pattern card for each separate weft or pick of the loom.



New Carpet. Fig. 2.

Book Notice.

COLOUR IN WOVEN DESIGN, by Roberts Beaumont. Professor of the Textile Department, Yorkshire College, Leeds. *London:* Whittaker and Co.

This recently published work will be most heartily welcomed by all sections of those engaged in the manufacture of coloured fabrics. It contains a fund of sound, practical, information, invaluable to the manufacturer and student alike. The uses, attributes, qualities, and the laws of contrast and harmony in colours are treated upon, and the technicalities characterizing woven colour combinations are fully analysed. The blending of raw materials of different shades is a subject of the first importance to those engaged in the making of fancy tweeds and similar woollen fabrics, and this is worked out in such a manner that, with a little practical knowledge of blending, the whole matter can be thoroughly understood. Yarns and fabrics in different shades and patterns are fully treated upon, as well as stripes, checks, simple and compound colourings, spotted effects, colouring of double weaves and reversibles, and fancy designs of an intricate nature. The work is, in our opinion, a complete and practical treatise upon the colouring of fabrics, and we can highly recommend it to our readers. It contains a large number of plain, coloured, and chaste, ornamental patterns, the preparation and weaving of which are fully demonstrated to the reader. Many of the designs printed in the work are, in weave and colouring, exact reproductions of what has been produced in the Yorkshire College. Professor Beaumont is to be congratulated upon his issue of such a practical publication.

DESIGNED BY R. T LORD

SILK GOODS.

PRINTED BLIND.

PRINTED HANDKERCHIEF.

FASHIONABLE DESIGNS.

* * * * * A Supplement, containing Woven Specimens of the Designs given on this page, is presented each month to those of our Subscribers who manufacture Cloth for Ladies' and Gentlemen's wear.

Ours was the first Journal in this country to give woven samples of various descriptions of fabrics regularly each month, and since we commenced this feature, some years ago, it has, to some extent, been adopted by others. In matters connected with every branch of designing, we stand ahead of all other Journals.

Woollen Trousering.

Warp :—

1 end	Red Twist,	14 skeins.	
6 ends	Grey,	,,	
1 end	Black,	,,	
1 ,,	Grey,	,,	
1 ,,	Black,	,,	
2 ends	Grey,	,,	
1 end	Black.	,,	
1 ,,	Grey,	,,	
1 ,,	Black,	,,	
3 ends	Grey,	,,	
1 end	Blue Twist,	,,	
6 ends	Grey,	14 skeins.	
1 end	Black,	,,	
1 ,,	Grey,	,,	
1 ,,	Black,	,,	
2 ends	Grey,	,,	
1 end	Black,	,,	
1 ,,	Grey,	,,	
1 ,,	Black	,,	
3 ends	Grey,	,,	
	36 ends in Pattern.		

3,200 ends in warp ; 50 ends per inch ; 6½'s reed, 8 in a reed ; 52 picks per inch ; 64 inches wide in loom ; 56 inches wide when finished. Weight 29½ ozs.

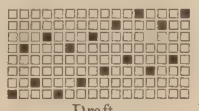
Weft :—

2 picks Black, 13 skeins.
2 ,, Grey, ,, ,,

4 picks in Pattern.

No. 661.

Design.



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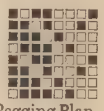


Pegging Plan.

Woollen Suitings.

Warp :—

4 ends	Brown,	9 skeins
1 end Brown and Yellow Twist,		9 skeins.
2 ends Brown and White Twist,		,, ,,
2 ends	Brown,	,, ,,
2 ,, Brown and White Twist,		,, ,,
2 ends	Brown,	,, ,,
2 ,, Brown and White Twist,		,, ,,
1 end Brown and Yellow Twist,		,, ,,
	16 ends in Pattern.	

Weft :—

4 picks	Black,	9 skeins.
1 pick Black and Red Twist,		9 skeins.
2 picks Black and White Twist,		,, ,,
2 picks	Black,	,, ,,
2 ,, Black and White Twist,		,, ,,
2 picks	Black,	,, ,,
2 ,, Black and White Twist,		,, ,,
1 pick Black and Red Twist,		,, ,,
	16 picks in Pattern.	

No. 662.

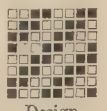
1,920 ends in warp ; 80 ends per inch ; 7½'s reed, 4 in a reed ; 31 picks per inch ; 64 inches wide in loom ; 56 inches wide when finished. Weight, 26½ ozs.

Design.

Warp :—

2 ends	Thick Twist,	3 skeins.	
2 ,,	Black,	8 ,,	5 times.
2 ,,	Blue Twist,	8 ,,	
2 ,,	Black,	8 ,,	
	24 ends in pattern.		

No. 663.



Design.

Weft :—

22 picks Black, 10 skeins.
2 ,, Red and Black, 10 skeins.

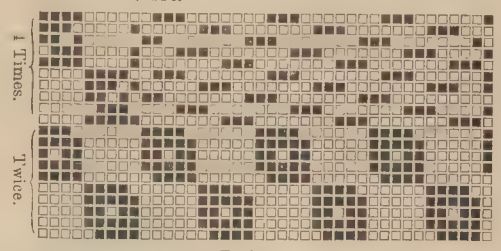
24 picks in Pattern.

1,792 ends in warp ; 28 ends per inch ; 7's reed, 4 in a reed ; 27 picks per inch ; 64 inches wide in loom ; 56 inches wide when finished. Weight 27½ ozs.

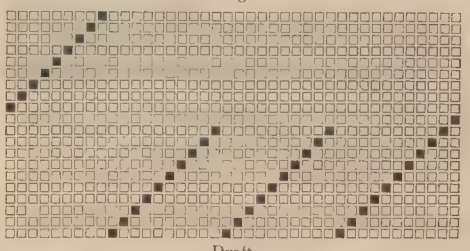
Worsted Coating or Vesting.

4,100 ends in warp ; 64 ends per inch ; 8's reed, 8 in a reed ; 104 picks per inch ; 64 inches wide in loom ; 56 inches wide when finished. Weight 24 ozs.

No. 664.



Design.



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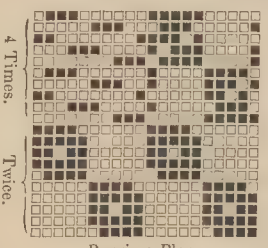


Pegging Plan.

Warp :—

6 ends	Black,	17 skeins.
4 ,,	Blue,	,,
5 ,,	Black,	,,
5 ,,	Blue,	,,
5 ,,	Black,	,,
5 ,,	Blue,	,,
5 ,,	Black,	,,
5 ,,	Blue,	,,
	40 ends in pattern.	

Weft :—2/48's worsted.

Commercial Failures.

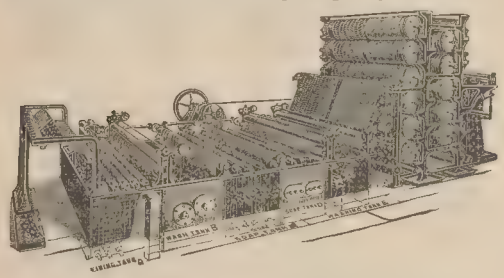
According to *Kemp's Mercantile Gazette*, the number of failures in England and Wales gazetted during the four weeks ending Saturday, October 25th, was 297. The number in the corresponding four weeks of last year was 321, showing a decrease of 24, being a net decrease in 1890, to date, of 476. In addition to these gazetted failures, there were 211 Deeds of Arrangement filed at the Bills of Sale Office during the same four weeks. The number filed in the corresponding four weeks of last year was 289, showing a decrease of 78, being a net decrease in 1890, to date, of 210. The number of Bills of Sale published in England and Wales, for the four weeks ending Saturday, October 25th, was 699. The number in the corresponding four weeks of last year was 749, showing a decrease of 50, being a net decrease in 1890, to date, of 975. The number published in Ireland for the same four weeks was 30. The number in the corresponding four weeks of last year was 39, showing a decrease of 9, being a net decrease in 1890, to date, of 65.

The large dealers in French wool, whose head quarters are in Paris, have combined together for the purpose of making Paris a central market for French wool, and keeping French buyers away from the English and the Belgian markets. To attain this end, the auction plan, which has been successful in London and in Antwerp, will be adopted. It is estimated that France produces 125,000,000 francs of wool yearly.

MACHINERY, &c.

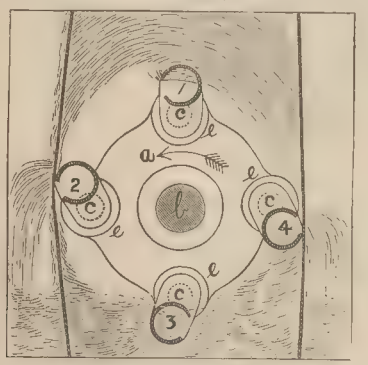
Open Washing Machines.

It will be interesting to many of our readers to know that a machine, which, for the past two years, has proved invaluable to calico printers and cotton piece dyers, can be applied with equal success to Yorkshire goods. Although constructed on very simple lines, it is the most efficient open washer in the market, and it seems, from what we have seen of a double width machine lately erected for Messrs. Whitaker, Bros. and Co., of Newlay, that it will prove of inestimable value to Yorkshire dyers. The process of washing is naturally performed much quicker in an open machine than in the ordinary dollying apparatus, and it is certain that a large quantity of goods, which, at present, is put through the slow, old fashioned dolly, can be more economically and satisfactorily washed in this patent open washer. For a complete and illustrated description, those who are interested should apply to the makers, Sir James Farmer and Sons, Adelphi Iron Works, Salford, who will be glad to give any information, and



Farmer and Sons' Open Washing Machine. Fig. 1.

if necessary, pass any cloth through a sample machine at their works. We give a block of the complete double width machine, with drying tins attached. The machine is constructed to take either two narrow or one wide piece, the openers being made reversible to suit. The tanks, c and e, being in section, show the patent beaters, and it will not be out of place to give a short description of these beaters, as they form the fundamental principle on which the machine is based. a, (Fig. 2, *Section*) is a cast iron end plate fitted on to each end of the shaft b. At e, e, e, e, are four bosses, which are bored out to receive the crank pins attached to cranks, c, c, c, c. These four cranks carry four slotted brass tubes, 1, 2, 3, 4, the slot in each tube extending

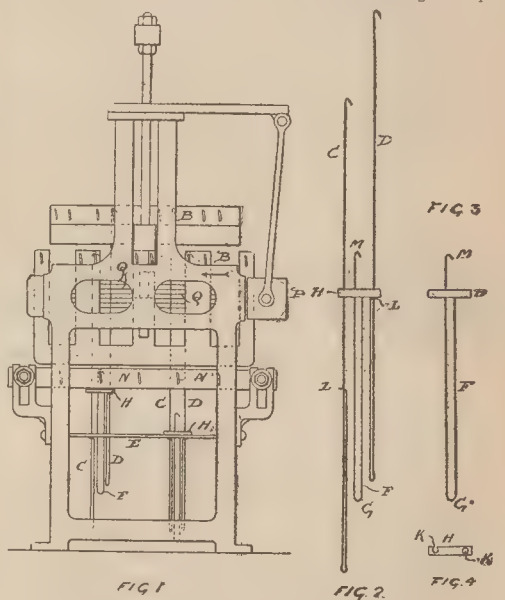


Farmer and Sons' Open Washing Machine. Fig. 2.

from end to end. The shaft, b, being put into motion up to about 300 revolutions per minute, we should naturally find that these four tubes would fly out with centrifugal force from their crank centres, e, as in tube 1. In this position, the tube comes in contact with the water, but entering, as it does, at a high speed, the resistance which the water offers forces it back on its swivel to the position shown in tube 3; here it fills itself while passing through the liquid, and, immediately on emerging, flies out with a sharp jerk to its natural position, and so discharges the water contained in the tube against the cloth. This action is repeated by each tube in turn, and with a speed of 300 revolutions per minute on the shaft, we have 1,200 discharges per minute into the cloth at *both* 2 and 4, which gives a steady and efficient flow of water on the cloth, with force enough to go quite through the piece. The same action of the beaters is applied to vibrate the cloth, and the piece being set to come in contact with the oscillating tubes at 2 and 4, receives 1,200 blows per minute on each side. It will easily be seen that this shaking action helps materially in the washing of the cloth, and, combined with the heavy flush of water, is calculated to cleanse and soften any dyed goods, although they may be of the dirtiest and hardest description.

Priestley and Co.'s New Jacquard Machine.

In the making of jacquard machines, especially those of the double-lift, open shed patterns, efforts have repeatedly been made by producers of this class of apparatus to increase its efficiency, yet, during the past few years, but slight progress has been made. Messrs. M. Priestley and Co., of Copley Street, Bradford, have worked in this direction, but with little success until recently, when they devised an improvement on the double-lift jacquard in general use, which will meet the hearty approval of fancy goods manufacturers generally, and which has already gained much attention from them, and, judging by the favour it has already met, will make its mark in the textile trades. The improvement is very simple in its mechanism, and one that many will think ought surely to have been thought of long ago. It is mainly in connection with the upright wires, which are arranged and constructed in such a manner that more time is obtained for the jacquard cylinder to alter its position to change the pattern surface, thereby enabling the jacquard, and loom to which it is attached, to be run at a greater speed



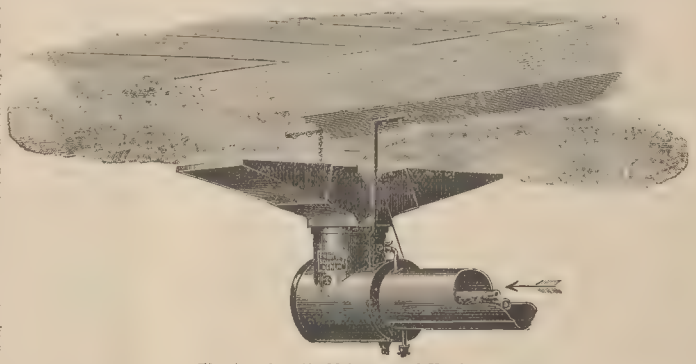
Priestley and Co.'s New Jacquard Machine.

than is the case with upright wires constructed on the old plan. With uprights of the ordinary construction, when any are required to be changed, the card cylinder is kept in contact with the respective cross wires, until the ascending lifting grate has passed the descending hooks of the other legs of the respective uprights, then the card cylinder is allowed to recede, and the uprights to return to their normal vertical position, and at the bottom to rest upon the ordinary perforated guide board. The patentees, in carrying out their object, construct and operate the reciprocating grates as in existing machines, but, instead of forming each pair of double-lift uprights of one piece of wire, or, when formed of two pieces, attaching them together at the bottom by links, &c., they make each pair of uprights separately, and mount them in the machine in a similar manner to that hitherto adopted, but independent of each other. Between each pair of uprights is placed an additional upright, having a hook at, or near, the top, and, to the bottom, they attach the harness or healds in the same way as with ordinary double-lift uprights. In some part of each additional upright, they place a cross bar, having a slot on each side, through which the uprights pass, and when any upright is in position for the ascending grate to raise the same, some part of the ascending upright comes in contact with the cross bar of the additional upright and, in consequence, raises it likewise, the hook of the additional upright, when at the top of its traverse, engaging with a supporting bar, until liberated by the card cylinder operating the cross wires and uprights in the following manner:—When any raised upright is required to be lowered or changed, the respective cross wire, embracing the ordinary uprights, is operated by the card cylinder such a distance that the hook on the additional upright is clear of the supporting bar, and is lowered by the descending grate and upright, where it remains until the pattern surface allows the upright to be in such position as to be raised. By this arrangement of centre and additional uprights, the pressure on the end of the cross wires is only required until the

hooks of the additional uprights are clear of the supporting bar, thus greatly reducing the time required for the cylinder to be in contact, and also obtaining a corresponding increase of time for the card cylinder to change the pattern surface. Fig. 1. represents a portion of a jacquard machine. Fig. 2. is a view of a pair of double-lift needle bars made according to this invention, the centre needle being shown resting on the collar of one upright or bar, which is raised. Fig. 3, is a detached view of a centre needle, and Fig. 4 is a plan of the same. In carrying out the improvement, the reciprocating grates, A and B, are constructed and operated as hitherto, each pair of uprights, C and D, being made separately, with a collar L on each, and are mounted in the machine somewhat as hitherto, but independently of each other, and with the lower parts passing through a perforated plate, E. Between each pair of uprights, C and D, is placed an additional upright, F, having a hook at, or near, the top, and to the bottom of the centre upright, F, at G, is attached the harness, or healds, in the same manner as to ordinary jacquard uprights. In some part of each additional upright, F, a cross bar, H, is secured, having a slot hole, K, cut near each end, and through which the uprights, C and D, pass, and when either bar, C or D, of the double uprights, is in the position for the ascending grate, A or B, to raise the same by the ordinary hooked portion at the top, the collar, L, of the ascending upright being in contact with the cross bar, H, of the centre, or additional upright, F, raises the latter, likewise, the height of the "lift"—the hook, M, of the additional upright, F, when near the termination of its upward traverse, engages with a stationary supporting bar, N, similar in section to those on the reciprocating grates, A and B, thereby retaining the harness, or healds, and warp threads in an elevated position, until liberated by the card cylinder, P, operating on the cross wires and uprights, C and D, in the following manner. When any centre upright, F, is raised and resting on a supporting bar, N, and the pattern of the fabric requires it to be lowered, the respective cross wire, Q, embracing the uprights, C and D, is operated by the oscillating card cylinder, P, in the ordinary manner, at the time when one of the reciprocating grates, A or B, is at the extreme or termination of its upward traverse; and when the hook M, of the centre upright F, is raised clear of the supporting bar, N, the cross wire, Q, and respective uprights, C and D, are moved in the direction of the arrow a sufficient distance for the hook, M, to clear the stationary supporting bar, N, and are held clear by the card and cylinder, P, until the hook is below the top of the supporting bar, N, and when the upright, C or D, and the centre upright, F, arrive at the bottom, they will remain until the pattern surface allows the upright, C or D, to be in such a position that the hook at the top of one of the uprights may engage with the ascending grate, A or B. By this arrangement of additional centre upright, F, the pressure on the end of the cross wires, Q, is not required, until the hooks, M, of the additional uprights, F, are raised clear of the supporting bar, N, and, on lowering, the pressure is only required to remain on until the hooks, M, are clear of the stationary supporting bar N, thus greatly reducing the time for the card cylinder, P, to be in contact, thereby obtaining a corresponding increase of time for the card cylinder to rotate and change the pattern surface, and thus be enabled to proportionately increase the speed of the loom.

The "Aërophor" Air Moistener and Ventilator for Cotton and other Mills, &c.

Much controversy has taken place, and innumerable complaints have been made, anent the excessive steaming or humidifying of mills. This question has been thoroughly ventilated in our columns on former occasions, both from the employers' and employés' point of view. Undoubtedly, workpeople have had great cause for complaint on the matter, and a large number of employers have so far agreed with them that the evil ought to be abated, that they have, in many cases, introduced systems of humidifying their mills, which have proved more or less successful. It has been allowed, on nearly all hands, that, in the weaving of certain classes of goods, a humid state of the atmosphere is a necessity, the degree of moisture required varying according to the warps being used, but how to provide this moisture without its being in any way derogatory to the health of the weaver has been a problem rather difficult to solve, consequently, many have attempted to tackle the subject in a practical manner. In some cases, the remedies suggested have been out of the question, owing to the first and subsequent cost, others have been reasonable in this matter, and employers, as stated above, have taken advantage of them, to their own and their workpeople's benefit. One of the latest appliances for the purpose is the "Aërophor," which has stood every requisite test as to its adaptability for its work, and when we state that no fewer than 7,000 apparatus have been fixed and are working satisfactorily, it needs no recommendation from us as to its high state of efficiency. It is a well-known fact that a continuous and equable degree of atmospheric moisture in spinning and weaving rooms not only increases the output, but also has a tendency to improve the quality of the yarns and fabrics produced, by rendering them evener, smoother, and of a better finished character. This, of course, is well understood, but how to arrive at a system of producing an equal atmosphere is another thing, and it is claimed for the "Aërophor" that it can be so regulated in its action that almost any degree of humidity can be produced and maintained, according to requirements, without the drawback of being injurious to the workers, or to the quality of work done. The methods formerly employed, and much used now, of steaming the rooms, have much to answer for. The "Aërophor," the mechanism of which can be understood from the annexed drawing, distributes moisture in the form of a fine water-cloud, which may be either warm or cold. The advantages claimed for the apparatus are:—1st. An equal degree of humidity may be produced and maintained throughout the year. 2nd. The production of spinning and weaving is increased from four to eight per cent.; there are fewer breakages of threads, and improved work is ensured; in fabrics, evener, smoother, and more brilliant cloth is woven. 3rd. The atmospheric conditions of the workrooms are far healthier and more agreeable for the workpeople, and there are no noxious vapours created, as is the case by steam. Through each apparatus 500 cubic feet of air passes per minute, which is washed, purified, and thrown into a room, at a degree of moisture regulated by a valve. When moisture is not required, the air can be passed through the apparatus alone, being simply washed and cooled. The "Aërophor" system is in most extensive use throughout the Continent and America. Since its introduction into the United Kingdom, a few months ago, it has been adopted by many of the leading spinning and manufacturing firms in Lancashire and Yorkshire, amongst which may be mentioned the following:—Horrockses, Crewdson and Co., Preston, and Moses Gate, Bolton; Hurst Mill Co., Ashton-under-Lyne; J. Dewhirst and Son, Skipton; J. Thompson and Co, Blackburn; D. and W. Taylor, Blackburn; I. and I. Broadbent, Bradford; S. Higginbotham and Son, Ashton-under-Lyne; G. Brown and Co., Chorley; Green and Co., Ewood; Dale Mills Co., Newchurch. From the firms using the "Aërophor," the highest testimonials have been received, and, what is of the greatest importance, the workpeople like it, as, by its aid, they turn out better work, with a saving of



The Aërophor Air Moistener and Ventilator.

labour and an increase in their earnings. The employers like it, because it improves the work and quickens the output. Eminent men prognosticate that, at no distant date, steaming the atmosphere in textile mills will be totally abolished. The "Aërophor" is cleanly, it is easily fixed, it occupies but a small space, can be regulated to meet varying requirements and occasions, and little or no trouble is given on its manipulation. There is no rusting of machinery by this process, and no perceptible humidifying of the atmosphere; it does its work noiselessly, and with unvarying regularity, and, for an invention of so great utility, is inexpensive. All information with reference to the apparatus can be had on applying to the "Aërophor" Co., 17, Victoria Street, Manchester.

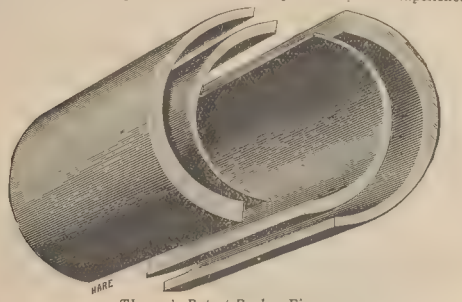
Improvements in Lubricating the Wires of Carpet, Rug, and other Looms.

In order to lubricate the wires of carpet, rug, and piled fabric looms, it has been customary, during the withdrawal or insertion of the wires, or both, to pass them through a brush or brushes moistened or charged with oil, from time to time. The wires, during the passage through the brush or brushes, take up portions of the oil held by the brush or brushes, and the oil thus taken up by the wires lubricates them and enables them to be more easily withdrawn from the fabric, reducing the friction upon the wires and preventing them from getting hot. Difficulties have been experienced in the use of oil as a lubricant, owing, among other causes, to its liquid character. As the brushes are usually moistened or charged by hand, it has been found difficult to ensure regularity in the quantity of oil applied from time to time, so that, when too much has been applied, too much has been taken up by the wires, and transferred by them to the fabric, to the detriment of the latter, especially where it is composed of light coloured fibres, the superfluous oil frequently impairing the colour of, and soiling, the material, causing dust to adhere to it. It has also been found that, immediately after the brushes have been moistened with oil, a larger quantity is taken up by the wires than at a later period, and that the quantity thus taken up gradually decreases, until the brushes have been again moistened with the fluid. Unless the wires take up a sufficient quantity of oil, it becomes difficult to withdraw them from the fabric, and they become hot, and the surface of the fabric is, consequently, liable to injury. In place of the brush or brushes alluded to above, "tufts" or "tassels" of worsted, or other material,

are sometimes used. This invention has for its object the avoidance of the above drawbacks, and, for this purpose, instead of applying oil or like liquid lubricant to the wires as hitherto, a suitable lubricant, of a practically solid character or consistency, is used, which is applied to the wires during their insertion or withdrawal, or both, by means of suitable mechanical contrivances, that are so constructed and arranged that a regular supply of the solid lubricant is applied to the wires, thereby reducing friction, and rendering the withdrawal of the wires easy, and avoiding risk of injury to the fabric. In practice, good results have been obtained by using paraffin in a solid form.

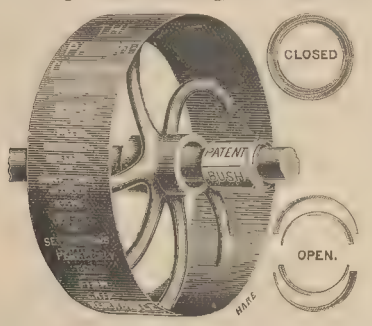
Thomas's Patent Bush for Fixing Bored Pulleys and Couplings to Shafting.

New inventions in connection with pulleys are constantly coming to the front. One which has many advantages has been brought before users by Messrs. A. L. Thomas and Sons, Engineers, Dover, and as it has features which should recommend it to those interested in machinery, a description of it will be welcomed by our readers. A difficulty has always been experienced



Thomas's Patent Bush. Fig. 1.

by users of "*bored*" pulleys, as they have disadvantages that cause, at times, much inconvenience, by the working loose of keys, bolts, and set screws. Messrs. Thomas's invention dispenses with the use of these entirely, by the substitution of a *bush*, which locks the pulley firmly upon the shafting, and the well-known difficulty of fixing ordinary pulleys on the latter, which is often of full diameter in places, and has to be reduced by filing and turning, is overcome. The bush is equally adapted for rolled or turned shafting, as the fact of the former being seldom perfectly cylindrical makes no difference in the action of the bush. The general features of the invention can be seen from Figs. 1 and 2. In fixing, the inner and outer concentric



Thomas's Patent Bush. Fig. 2.

wedges of the bush are lubricated, the latter is then placed upon the shaft, the pulley is passed over the bush, the proper position on the shaft is guaged, and the pulley is given a jerk round to tighten it. The power transmitted through the pulleys or couplings has a tendency to increase the grip. It will be seen that, in fixing, the pulley does not require to be removed from the shaft. As the power applied when running increases the grip, the bush must be fixed for right or left hand running accordingly, but it is only necessary to reverse the bush, which is in halves, (see Fig. 1), for opposite driving. The concentric wedges are so tapered that, after the maximum driving strain is applied, there is little fear of them loosening, through pulleys over-running. For millowners generally, a small stock of the bushes for various sizes of shafting will be a great advantage. Messrs. Thomas will give prices, &c., on application.

A new laboratory for the demonstration of the dyeing of cotton and wool fabrics, as applied to the lace and hosiery trades, has been opened at the Nottingham College, and will, no doubt, prove to be of great use to students attending the technical classes in connection with the above trades.

Shear Grinding.

It will be noticed by those who have read the preceding articles on the subject of shearing that the special topic of shear grinding was either only partially noticed or wholly omitted. This was intentional. So very important is this particular feature of shearing that we felt incompetent to do it justice in connection with our other remarks upon such a broad and comprehensive subject, consequently, we now intend to give it separate consideration. It is this process of shearing which is most likely to be the successful finisher's pride. As he looks at his finished goods in all their beauty, and admires their almost faultless appearance, it is with a sort of unique satisfaction that he points you to his shears, more than to any other machine, as the prime cause of all his success. The finisher, and especially the shearer, who does not like his work, had much better give it up entirely. This we say because the shearing is one of those operations which demands so high a degree of skill and attention that none but the man who takes an honest pride in his work can ever hope or expect to attain to the highest points of success. The first elements in the care and attention which should be bestowed upon the shear, we have already mentioned in a previous article—first, as regards the light, and, secondly, as regards the foundation. The one must be plentiful and unobstructed, and the other must be firm and immovable. Now, perhaps, our best plan would be to suppose that we are dealing with a shear that is quite out of order, and which we must endeavour to put in shape again for good and successful work. Our whole machine is giving most unsatisfactory work, so that we hardly know just where to place our finger and say here lies the cause of the evil. We must look at once for signs of weakness throughout the whole machine. We may find that the bearings of the revolver are worn considerably away. This, of course, will place the revolver out of level and cause the blades to run untrue. The ledger blade, moreover, will most likely be partly worn here and there, from long and constant usage, and so our cloth will not come evenly in contact with the cutting edges of the revolver blades. Other parts, likewise, may be in a demoralized and bad condition. The first step will, naturally, be to start with the revolver bearings and put them in proper condition, by having them turned down and filed with babbett metal. Once the bearings are in shape, then turn up the revolver itself, until it is in perfect order, using either traverse or solid lead cylinder. If it happens that the middle of the revolver is true, while the ends are worn away, then set it up to the cylinder, so that the middle just touches, and grind down slowly, until it touches throughout its whole length. Be very careful not to push or set one end of the revolver up to the cylinder faster than the other. If, on the other hand, the revolver is hollow in the middle, then set the ends so that they just touch the cylinder, and grind carefully and slowly until a good sharp edge is obtained all along the revolver. Now, we suppose that we have our revolver in good condition. Replace it, then, in its position on the shear, in the bearings of the carriage. Then we turn our attention to the next point, namely, the ledger blade. It is possible that it may be so badly worn as not to be of any further use, but if we have not to replace it with a new one, we can, by grinding it down, make it serve its purpose almost as well as ever. It should be taken to the grinder and faced, as it is called. That is, grind a new broad bevel on the front of the blade, being careful to make it just a little broader than was the old bevel before it. This will allow of the free operation of the cloth between the rest and the blade. After this is all done, carefully place the ledger in its position on the shear, being sure to see that it is exactly parallel with the revolver, and very nearly up to its centre line. If there are centre-marks on the revolver, then it is a comparatively easy matter to set the blades evenly. But, if the revolver is not thus marked, we shall have to pursue the following course:—Centre the boxes, marking them on the inside, and set them midway of the screw which operates them up and down. Then place a rule, or straight-edge, on the face of the blade, even with the edge, and extend it to the arm of the carriage. Then, with a rule kept parallel with the centre line made on the box, measure down to the rule which is on the blade. If the rest is perfectly true, as it certainly should be, since it should be almost the last part of the machine to get worn, and as no filing or grinding of it should ever be allowed after it is once in perfect condition, it may be taken as a guide to set both ledger blade and revolver. Of course, we must first be sure that it is level and true. The rest should pitch from you as you stand in front of the shear, so that the lower inside edge will not hinder the cloth as it passes between the rest and the ledger blade. There is still another method of setting the ledger blade, which we shall mention presently, after explaining more fully the grinding of the blade. To grind or face the blade, as we called the process just above, it is best to remove only the blade, taking out the stay bolts, and leaving the bed undisturbed where it belongs. The main object in this grinding of the blade is to remove the iron, but, while doing this, we may also correct, as far as possible, any unevenness that may be in the steel edge itself. We have found the simplest and the best way to do this to be to grind off the edge of the blade square, until it is even all the way across. Having done this, we then place the blade so as to strike the face a little back of the old level, and far enough to give a broader level than before, when finished. This, as mentioned above, is necessary to give the cloth easy and free passage between the blade and rest.—*Boston Journal of Commerce.*

(To be continued).

Personal and Trade Notes.

The death is announced of Mr. John Lumgair, manufacturer, of Arbroath, N.B.

Messrs. Healy and Cope, hosiery manufacturers of Farnworth, have arranged to convert their business into a company.

The death is announced of Mr. J. Sugden, of the firm of Messrs. Atkinson Bros., woollen manufacturers of Holly Park Mills, Calverley.

Mr. A. Hindle, of the firm of Messrs. J. Hindle, of Carr Mill Shoddy Works, Musbury, Haslingden, died on the 1st ultimo.

The Northern Hosiery Company has been registered with a capital of £1,000 in £1 shares to buy, sell, and spin, wool, cotton, and other fibrous substances.

A silver medal has been awarded to the Rossendale Belting Co. of Manchester, for the excellence of their exhibit—hair belting—at the Edinburgh Exhibition.

On Monday, the 13th ultimo, the death occurred of Mr. W. H. Summerscales, of the firm of Summerscales and Sons, Keighley, machine makers, Park Side Works.

The School-Street Mills Manufacturing Co., Limited, has been registered, with a capital of £5,000 in £1, to carry on business as weavers and manufacturers of cotton and woollen goods.

The sudden death of Mr. John Fish, of Messrs. Hampson and Fish, Ltd., manufacturers, of Moseley Street, Manchester, occurred at Southport, on the 13th ultimo. Mr. Fish was a Justice of the Peace for Lancashire.

The Holly Milly Co., Royton, has been registered, with a capital of £70,000, in £5 shares, to carry on any, or all, of the following trades:—spinning, doubling, weaving, bleaching, dyeing, and printing.

The Pearl Mill Co., which is erecting buildings at Glodwick, has been registered to carry on business as cotton spinners and manufacturers, with a capital of £120,000 in £10 shares.

For the statues which are in process of erection in recognition of the public and private benefactions of the two brothers Coats, of Paisley, £4,000 has been already subscribed.

Messrs. Maden, of Bacup, are having their weaving shed at Throstle Mill fitted up with patent ventilators and humidifiers, by Messrs. Matthews and Yates, of Todd Street Engineering Works, Victoria Station, Manchester.

On the 18th ultimo, the workers in the employ of the East Mill Co., Ltd., Brechin, on getting their weekly pay, were agreeably surprised by receiving a bonus of one week's wages, in recognition of their services during the past year.

Mr. T. E. Taylor of Dodsworth Hall, Barnsley, head of the firm of Messrs. T. Taylor and Sons, linen manufacturers of that town, died on the 13th ultimo. The deceased was one of the oldest magistrates of the Barnsley bench, having been appointed in 1862.

To Messrs. Wilson Bros., bobbin manufacturers of Todmorden, has been awarded, at the Edinburgh International Exhibition, a silver medal, for the bobbins shown by the firm, and Messrs. Crossley Bros., Openshaw, Manchester, makers of gas engines, have been awarded a diploma of honour.

The sudden death of Mr. Charles J. Critchley, at his shooting-box in Westmoreland, was announced last month. Mr. Critchley, who was a member of the firm of Blakeley and Critchley, woollen manufacturers, College Mill, Birstal, was a Justice of the Peace for Batley, and a prominent Conservative.

Adam L. Cochrane and Brothers, Limited, has been registered with a capital of £120,000, divided into 8,000 preference shares, and 4,000 ordinary shares of £10 each. The office of the company is to be in Galashiels. The object is to acquire and take over as a going concern the business of woollen manufacturers now carried on at Netherdale, Galashiels, under the firm of Adam L. Cochrane and Brothers.

Mr. George Andrews, senior partner in the firm of Messrs. G. Mayall and Co., of Mossley, cotton spinners, died on the 27th ultimo, at his residence, Apsley House, Mossley. When Mossley was created a Local Board district, Mr. Andrews was elected the first Chairman, and upon the incorporation of the borough, he was chosen the first Mayor. He was also the oldest resident county Magistrate in the district.

The Right Hon. the Earl of Londesborough, accompanied by Colonel Young, recently paid a visit to the braid and boot-lace factory of Messrs. Foxton Brothers, Ltd., Selby. His lordship took great interest in the dyeing and lustring of the yarns, and in the manchine shed, with its thousands of spindles. Every process in the manufacture of braids and boot-laces is to be seen in operation. Lord Londesborough built the extensive works in 1888 for Messrs. Foxton.

The death of Mr. A. Craig occurred on Saturday morning, the 11th ultimo, at his residence, Edinburgh. Deceased, who was well known as the head of the firm of Craig Brothers, wholesale warehousemen, Chambers Street, and who was 82 years of age, was the pioneer of the Scotch tweed trade in London. It was he who introduced cloth of Scotch manufacture into the Metropolis, and he was called, among many in the same line, the "father" of the tweed trade. Until about twelve months ago, when he retired from active business, he was the chief partner in a firm which is about two hundred years old. He was a Conservative and a member of the Established Church, but took little active interest in the affairs of the city, or in politics generally.

Odds and Ends.

The foundation-stone of a Technical School for Coatbridge, N.B., was laid recently by Sir Archibald Campbell, Bart., of Blythswood.

The next of a series of national exhibitions promoted by Mr. J. R. Whiteley, at Earl's Court, and which began with the American exhibition, will be devoted to the arts and industries of the German Empire.

The Clothworkers' Company, who made a grant of thirty-thousand pounds for the building and equipment of the Textile Industries and Dyeing Departments of the Yorkshire College, Leeds, have increased their annual subsidy for the maintenance of these departments and the art classes to one thousand eight hundred pounds.

According to the *Russe Commerciale*, Russian manufacturers are making strenuous efforts to extend their trade in Persia. A commercial and industrial company has been formed at St. Petersburgh, which will establish branches in Persia, with a view to facilitate the introduction of the manufactured products of Moscow and Lodz. It would appear that the large quantities of printed calicoes, with designs according to the Persian taste, have been ordered in Russia.

An investigation of the use of gas under steam boilers is said to show that, with the present method of boiler heating, it requires 2½ cubic feet of gas to evaporate one pound of water, but that, with the use of a proper burner, one pound of water may be evaporated by 1·38 cubic feet of gas. The same principle is declared to apply to the making of salt and the puddling of iron; that is, to puddle a ton of the latter, the mills use some 28,000 cubic feet of natural gas, while experiments show that the same work might be done with half that quantity.

According to a statement made by Mr. H. H. Hayter, the Government Statist of Victoria, the manufactories and works of Victoria number 3,305. The approximate horse-power employed in them represents a total of 28,543, and the hands engaged number 50,815 males and 8,327 females. Approximately, the value of the machinery and plant is £5,934,130; the land £5,573,682; and the buildings and improvements £4,280,158. Engine, machine manufactories, and iron foundries, including boiler and pipe-covering makers, of which there are 186, are valued at £735,745.

An official report to the Belgian Government states that the "gulmbobo" or "angu" of the Mexican State of Vera Crux possesses a fibre finer and stronger than silk, and of similar lustre. Experiments already made are said to indicate that the guimbobo differs essentially from ramie, cotton, and hemp, in having the plant covering around the fibre instead of mixed up, and interlaced, with it. This makes it practicable to separate and remove the bark by means of machinery. The plant grows luxuriantly with little care, and produces highly-esteemed food in addition to the fibre.

According to a recent German patent, a bleaching oil may be made by the use of about 10 kilos. of good bleaching powder dissolved in 100 litres of cold water. Twenty litres of the clear liquid are then mixed with 100 kilos. of dark coloured heavy petroleum of sp. gr. 0·905 at 20°, or with tar oils, and the mixture thoroughly stirred up and allowed to settle. The oil, which is still somewhat turbid, is drawn off and mixed with the heaviest distilled resin oil, in the proportion of 25·30 parts to 50·75 parts of the latter. Fabrics treated with this mixture are said to require much less time and treatment for bleaching than otherwise.

Commercial travellers who offer goods for sale in the interior of Brazil, by means of samples, being, as they are, in fact, the agents of the commercial firms to which they belong, which firms pay taxes in the localities in which they are established, are not subject to any imposition on behalf of the general revenue, they may, however, be subjected to some municipal contribution by the States in which they travel. Those, however, who may establish themselves in any place, and sell their goods on commission, are considered as commission merchants, and, as such, are liable to the charges mentioned in Tables (A) and (D) of the regulations established by Decree No. 9870 of the 22nd February 1888.

A trade marks law has recently been passed by the Danish Legislature. It provides that any person carrying on a manufacture or trade in Denmark may acquire the exclusive right to a trade mark by registration. Registration confers the right to use the mark for all kinds of goods, differing in this respect from British law, except in cases where it has been specially confined to certain kinds of goods. The Act does not appear to define what a mark is, but only, negatively, says that marks cannot be registered if they consist (1) exclusively of numbers, letters, or words, not having so peculiar a form that they can be regarded as distinctive; (2) of any other name or firm that that of the applicant, or the name of others' real property; (3) public coats of arms and marks; (4) scandalous representation; (5) if it is so similar to an already registered mark, that it is likely to be confounded with it. British firms can have the marks that they have registered in their own country registered in Denmark, on production of proof of the British application. If an application is made within four months from the date on which the British mark is applied for, the Danish application is regarded as made on the same date as the British, as against other applicants. In cases of unintentional infringement, injunctions against the use of the mark and sale of marked goods are granted, while, if done purposely, fines from £10 to £100, and, in cases of repetition, imprisonment may be imposed, besides damages for loss occasioned, and the destruction of the fraudulently marked goods may be ordered. The registration holds good for 10 years, after which time it can be renewed.

The presence in dye-houses of great quantities of steam, rising from the dye-vats and forming a cloud, which makes it difficult to see things in the room, is a very great evil; it should be removed, and measures should be taken to keep the dye-house clear. The only way in which this can be done is to establish a current of air which shall pass through the room. The cloud or fog is due mainly to the fact that the air of the dye-house is too cold to keep all the vapour in an invisible form. Warm air takes up more water vapour than cold air, and this must not be forgotten when the attempt is made to rid dye-houses of vapour, for, if the attempt is made to draw out the air containing steam, then more air must be drawn in. If this latter portion of air is cold, it will lower the temperature of the room, and, because it can hold very little steam in an invisible form, it will increase, rather than diminish, the fog. It is necessary then, if possible, to avoid the admission of cold air into the dye-house. A current of warm air should be introduced, so that the vapour may be kept invisible, and as warm air is a little lighter and rises to the top of the room, it aids in this way in the circulation and in keeping the fog under control.

PATENTS.

Applications for Letters Patent.

Automatic locking motion for cotton, cotton waste, slubbing, &c., frames. H. Sutcliffe, Mytholmroyd.	31st Oct.	17,419
Balling machines. W. G. Bywater and T. B. Beanland, Leeds.	7th Oct.	15,841
Bobbins or spools and cams for holding slivers to be dyed or bleached. G. Young and W. Crippen, London.	8th Oct.	15,982
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Boilers. F. G. Bates, London.	21st Oct.	16,775
Boilers. H. C. Paterson, London.	21st Oct.	16,776
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Warp rollers or beams. C. U. Piatt and J. A. Pierrel, London.	31st Oct.	17,485

Patents Sealed.

13,665	13,952	14,207	14,230	15,056	15,455	16,513	6,750
9,296	14,153	15,512	15,687	15,739	2,616	7,049	10,578
13,491	13,720	14,905	15,129	15,956	16,007	16,041	16,156
16,258	16,311	16,370	16,390	16,522	16,713	19,106	6,908
10,762	11,005	14,802	15,850	16,014	16,212	16,553	16,769
16,910	1,240	6,226	6,794	8,538	8,573	11,378	

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Contents.

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Calculations.

SPECIALLY WRITTEN FOR THIS JOURNAL.

In a previous article, we dealt with the analysis of fabrics by a system of weighing the cloth, or as large a portion of it as it was possible to obtain, so as to ascertain the actual weight per yard of any given size, and, also, by the same method, ascertaining the weight of the warp and weft threads respectively, and, as the weight of yarn is designated counts, thus finding what counts or numbers the yarns really are. This system applies to fabrics which it is desired to either re-produce or to imitiate. In the present article, we intend to deal with the calculations of fabrics made from different materials, or from different sizes of the same material, either as separate and distinct threads, or where the different sizes or materials are twisted together to produce special effects.

If we were making a cloth from, say, 30's cotton, with 72 ends per inch, and 60 picks of 24's cotton, the piece to be 32 inches in the reed, made from 60 yards warp, the piece to be 54 yards from the loom, this would be an ordinary calculation of the weight of warp and weft respectively, and we should proceed in the usual manner with such calculations, by multiplying the ends, inches wide, and length of warp together, and dividing by 840, which is yards per hank of cotton, and by counts given, to get the weight of warp, and, to get the weight of weft, we should multiply picks, inches, and length of cloth together, and divide by 840 and counts, to give weight of weft, or to put it into simple formula—

$$\frac{72 \times 32 \times 60}{840 \times 30} = 5{\cdot}48 \text{ lbs. of warp.} \qquad \frac{60 \times 32 \times 54}{840 \times 24} = 5{\cdot}14 \text{ lbs. of weft.}$$

In making calculations of this kind, it is necessary to allow for waste of weft in weaving, which is a variable quantity, differing with the kind of material used—if the weft is good and strong, there will be less waste than where it is very soft, as there will be fewer imperfections in weaving, and for which pulling back is needed. The general allowance for waste is from 1½ to 5 °/ , and the best manner of dealing with it is to add it to the general formula of the weft calculation. If an allowance of 2½ °/ is made, we should, for every 100 hanks used, or proportion of 100, charge 102½ to the weight of the weft, therefore, it is only a question of proportion, in the ratio of 100 to 102½, and, by putting it into the same formula, we get the fraction reduced to its lowest possible limit, or the formula would be $\frac{60 \times 32 \times 54 \times 102{\cdot}5}{840 \times 24 \times 100} = 5{\cdot}27$ lbs. weft. And if it is desirable to get the cost of the warp and weft, and the price per lb. is known, we should again put the price per lb. in the formula, and thus the fraction, if any would be in pence. Say, the price of the warp is 9½d. per lb., and the weft 9d per lb., we should have the fraction of the lbs. and the fraction of the pence to deal with, which would give us additional trouble in working, besides making it easy to go wrong. If we, therefore, having the above formula, put the price to it as follows, the figures would, in most cases, cancel down, and only leave us with one fraction—that of the pence—in the actual cost. The formulæ would be as follows :—

$$\frac{72 \times 32 \times 60 \times 9{\cdot}5}{840 \times 30} = 52{\cdot}1\text{d.} = 4\text{s. } 4\tfrac{1}{2}\text{d.}$$

$$\frac{60 \times 32 \times 54 \times 102{\cdot}5 \times 9}{840 \times 24 \times 100} = 47{\cdot}4\text{d.} = 3\text{s. } 11\tfrac{3}{4}\text{d.}$$

If the above cloth was required in all wool, instead of cotton, and the same ends and picks were to be used, and the same weight retained, then we should require a worsted warp and weft of the same thickness as the above counts used. This would necessitate changing from a material of one denomination to that of another denomination. In cotton, the counts are based upon the hanks of 840 yards, and the hanks weighing 1 lb. indicating the counts; the worsted hank is 500 yards, and again the hanks per lb. indicate the counts—therefore, in 30's cotton we have 30 × 840 yards per lb , or 25,200 yards, and, if this be divided by 560, it will give us 45 as the counts worsted, equal to 30's cotton, and, dealing in the same manner with the weft, we find that 36's worsted is equal in weight to 24's cotton. In all cases, in changing from cotton to worsted, the proportion will be as 840 is to 560, or, to reduce them to the lowest terms, as 3 is to 2, or, to put it generally, the rule is—multiply the counts of the material given by the yards per hank of that material, and divide by yards per hank of the material to which we are changing. If we have a worsted yarn given, and wish to find its equivalent in woollen, the formula would be $\frac{\text{counts worsted} \times 560}{256} = \text{counts woollen, therefore,}$ if we are making a cloth with—

14 ends 30's worsted.	6 ends 30's worsted.
1 end 20's cotton.	1 end 20's cotton.
10 ends 30's worsted.	10 ends 30's worsted.
1 end 20's cotton.	1 end 20's cotton.

Instead of finding how may ends there are of each material, we find, by above rule, that 20's cotton is equal to 30's worsted, therefore, we might assume that the whole of the above threads are 30's worsted, and treat the calculation as one, or we might take the counts as 20's cotton throughout, with the same result. This is a method of calculation very suitable for those kinds of fabrics woven in white, and the white dyed afterwards, so as to produce stripes, as the cotton would not take the dye, but remain in its uncoloured state.

But it is in making the calculation for fancy twists that the above rule is of most service, that is, in yarns made up by twisting two or more threads together, either of the same material or size, but different in colour, or of threads of different sizes for the production of knop or loop yarns, &c. This rule will enable us, at once, to reduce the two or more different materials to the same denomination before making the calculation as the counts resulting from the operation of twisting.

If we twist together two threads of the same size, say 30's, the counts of the twisted thread would be 15's, or double the weight of the original, that is, if we twist 1 lb. of 30's of any material with another lb. of 30's of the same material, we should have 30 hanks weighing 2 lbs., or 15 hanks weighing 1 lb., which would be the counts. In the same manner, if we twisted together three threads of 30's, and used 1 lb. of each, we should have the length of 30 hanks weighing 3 lbs., or 10 hanks weighing 1 lb. = the counts, or we might deal with it in the form of a fraction, and assume that we twist, in the first case, one hank of 30 with another hank of 30, or $\frac{1}{30}$ of a lb. with another $\frac{1}{30}$ of a lb., and add the two together, which is another way of saying twisting together, and the result of the addition would be the $\frac{1}{15}$ of a lb., or, in the case of the three threads, $\frac{1}{30} + \frac{1}{30} + \frac{1}{30} = \frac{1}{10} =$ counts. Of course, the reasoning is quite simple where the threads are all the same, but if we wish to twist together two or more threads, different in size, we have then to take into consideration the difference in the length of the lb. weight of each of the threads. Suppose, for instance, we wish to twist a thread of 20's with a thread of 30's, here we have one with 20 hanks to the lb. and another with 30 hanks to the lb., and, as will be readily seen, we shall require 1½ lb. of the 20's to be equal in length to the 1 lb. of 30's, or, in other words, the doubled yarn equal to 30 hanks in length would weigh 2½ lbs., or, 12 hanks would weigh 1 lb., being the counts of the twisted thread. If we had three yarns, respectively 20's, 30's, and 40's, the reasoning would be the same. We should require equal lengths of each for the operation, and, if we use 1 lb. of the 40's, we should require 1½ lb. of the 30's, and 2 lbs. of the 20's, or, 40 hanks of the twisted thread would weigh 4½ lbs., and 1 lb. would contain 9·23 hanks, which would equal the

counts, or to use the system of fractions, $\frac{1}{20} \div \frac{1}{30} \div \frac{1}{40} = \frac{13}{120}$ of a lb. = the weight of one hank, therefore 9·23 hanks would equal 1 lb.

In all these calculations, it is necessary to find the relative proportion of weights of each of the respective threads for the same length, and to then reduce the weight to 1 lb., as this is the weight in which the count system is expressed.

Another simple method is to proceed as follows:—

$$\begin{array}{l} 40 \div 40 = 1 \text{ lb.} \\ 40 \div 30 = 1\frac{1}{3} \text{ ,,} \\ 40 \div 20 = 2 \text{ ,,} \\ \hline 40 \div \quad 4\frac{1}{3} \text{ ,,} = 9{\cdot}23 \text{ hanks in 1 lb.} \end{array}$$

The reason for dividing 40 by the gross weights is that 40 hanks weigh $4\frac{1}{3}$ lbs., and the counts must be expressed in 1 lb, as before mentioned.

The above rule will apply in cases of twisting thick and thin threads together so as to produce those thick bulky threads so much used for ornamenting tweeds, &c., but, if we have a fancy thread formed of two different materials, say, cotton and worsted, it would be necessary to reduce the two to the same denomination, before using the above rule. Suppose we wish to twist a thread of 40's cotton with a thread of 40's worsted, by formula given— $\frac{40 \times 840}{560} = 60$'s, that is—40's cotton is equal to 60's worsted; therefore, the question resolves itself into one of twisting together one thread of 60's worsted, and one thread of 40's worsted, and

$$\begin{array}{l} 60 \div 60 = 1 \\ 60 \div 40 = 1\frac{1}{2} \\ \hline 60 \div \quad 2\frac{1}{2} = 24\text{'s of twisted thread, that is—the} \end{array}$$

thread is one of 24's in the worsted system. Of course, we might reduce the worsted thread to the cotton denomination by the same formula as above :— $\frac{40 \times 560}{840} = 26\frac{2}{3}$ cotton, and then by above formula

$$\begin{array}{l} 40 \div 40 = 1 \\ 40 \div 26\frac{2}{3} = 1\frac{1}{2} \\ 40 \div \quad = 2\frac{1}{2} = 16\text{'s,} \end{array}$$

that is—the result of twisting the two together is 24's in the worsted system, and 16's in the cotton system, which are equal in weight and length—that is, 24 hanks of worsted are equal to 16 hanks of cotton in length. But we have more difficulty in the working when we use the cotton system, as, by reducing the worsted to cotton, we have a fraction to deal with, so that, in working these calculations, it is better to reduce them to that system which avoids fractions, and, if desired in the other system, to turn it by formula to the desired system. In the above example, having got the counts of the twisted thread in the worsted denomination, and we wish to have it in the cotton, the formula would be:— $\frac{24 \times 560}{840} = 16$'s—the thread in the cotton denomination.

If we wished to twist together a thread of 40's spun silk, 1 of 30's cotton, and 1 of 40's worsted, and to express the resultant thread in each denomination, we should, by preference, work in the worsted system, as the spun silk and the cotton thread can be reduced to worsted without fractions, whereas, the worsted would contain a fraction, if reduced to cotton. By formula, we find that 30's cotton is equal to 45's worsted, and 40's silk to 60's worsted, therefore, it is a question of twisting together 3 threads of 60's, 45's, and 40's, respectively, as follows :—

$$\begin{array}{l} 60 \div 60 = 1 \\ 60 \div 45 = 1\frac{1}{3} \\ 60 \div 40 = 1\frac{1}{2} \\ \hline 60 \div \quad \frac{35}{2} = 15{\cdot}65 = \text{worsted, and to reduce} \end{array}$$

it to the cotton denomination :— $\frac{15{\cdot}65 \times 560}{810} = 10{\cdot}43 =$ cotton.

Spun silk, being calculated on the same system as cotton, would be the same resulting thread as cotton.

If we wish to make a fancy loop or knop yarn by twisting 1 thread of 40's cotton with 1 of 15's worsted, the worsted allowed to take up 5 inches for the cotton 2 inches, so as to produce the loop or knop, and to then twist another thread of 40's cotton around the two, in the reverse direction, so as to bind the loops together, we should have the worsted thread thicker in proportion, as 5 : 2 : : 15 : 6, that is, the question would be one of twisting 2 threads of 40's cotton, and one of 6's worsted together, or reduce the cotton to the worsted denomination, and then it would be 2 threads of 60's worsted, with 1 of 6's worsted, or 1 thread of 30's worsted, with 1 of 6's worsted, and by formula—

$$\begin{array}{l} 30 \div 30 = 1 \\ 30 \div \quad 6 = 5 \\ \hline 30 \div \quad 6 = 5\text{'s worsted, the counts of} \end{array}$$

the resulting thread, and to express it in cotton $\frac{5 \times 560}{840} = 3\frac{1}{3} =$ cotton, whatever the combination—whether of different sizes of threads or of different systems of counting, the same formula as given above would apply, and in making the calculation for a cloth, where we have these different threads working, we should find how many ends of each size we had in the total width, and then proceed as in the first example given. Suppose we have a cloth as follows:—30 ends 2/30's worsted.

2 ,, 2/12's twist.
14 ,, 2/30's worsted.
2 ,, 2/12's twist.
48 ends in pattern.

Cloth woven 40 ends per inch, 64 inches wide, 60 yards warp, having 40 ends per inch, and 64 inches wide, we should have 40 × 64 ends in the total width, or 2,560, and dividing this by ends in pattern, 2,560 ÷ 48 = $53\frac{1}{3}$ patterns, the $\frac{1}{3}$ pattern, or 16, would be added to the ground, or 2/30's to make up the lists, we should have 53 × 4 ends 2/12's, or 212 ends, and 53 × 44 + 16 ends 2/30's, or 2,348 ends, therefore, the formula would be—

$\frac{2{,}348 \times 60}{560 \times 15} = 16{\cdot}77$ lbs. $\frac{212 \times 60}{560 \times 6} = 3{\cdot}78$ lbs.

and if we have the same pattern in the weft, and 36 picks per inch, and 54 yards cloth, we should have to find the proportion of picks of each counts per inch, which can be found by proportion, as follows :—

As 48 ends per pattern is to 44 ends of 2/30's so is 36 picks per inch : 33 picks of 2/30's.

As 48 ends per pattern is to 4 ends of 2/12's so is 26 picks per inch : 3 picks of 2/12's, therefore, $\frac{33 \times 64 \times 54}{560 \times 15} = 13{\cdot}57$ lbs.

$\frac{3 \times 64 \times 54}{560 \times 6} = 3{\cdot}08$ lbs.

We might also add to above formula the per centage of waste and the price, as in first example. There is a system of averages by which we could find what would be the average counts of a stripe of this kind, so as to work it all in one formula, of which we shall probably deal in a future article, but we think that the subject has been sufficiently protracted for the present.

Cotton Textiles.

SPECIALLY WRITTEN FOR THIS JOURNAL.

Different cottons, when mixed together, should, on an average, be of the same length of staple, the same colour, and of much the same strength. If a long and short fibre are mixed together, the yarn produced will be uneven, and, worst of all, there will be a greater amount of waste made at the different operations than if they had been of the same length. In cotton, where the length of the fibre is uneven, the longer ones will, in every case, tend to throw out the shorter. In scutching, care should be taken that the blades of the beaters are set to the feed rollers, in accordance with the length of the staple to be operated on. The edges of the beater blades should be kept sharp and smooth, otherwise, artificial nep will be formed, and the cleaning operation cannot be carried out with any degree of satisfaction. Where the beaters are set too close to the feed rollers, the fibre is apt to get broken or ruptured, and the strength of the yarn spun from it is thereby impaired. Weft cottons require less scutching than twist. The dust pipes, where the fanner is in use, ought to be well looked after, to prevent choking up: a clear draught from the cages is most important. In carding engines, the filleting, while being put on, should be held at an even tension throughout. For licker-ins, saw tooth fillets are most suitable for nearly all classes of preparations In setting a card, the licker-in should be placed as close to the feed rollers, as possible, without touching the cylinder, similarly to the licker-in and the doffer of the cylinder. The points of the wire should never be allowed to get dull or blunt, but should be ground by a perfectly true emery roller, as often as may be required, to put on a sharp edge. The stripping operation should be carried out two or three times a day, so as to keep the wires from getting clogged up by the short fibre and the impurities which the cotton contains. The carding should never be heavier than is actually required to keep up the supply for the succeeding machines, as, the lighter the carding, the better the quality obtained. In combing machines, the needles in the top combs and cylinders should always be kept in good condition, and never allowed to work when broken or hooked. The cylinders ought to be cleaned once every fourth day, and the combs cleaned and set throughout every three months. The per centage of waste taken out at the combs should be watched carefully, and no more allowed to be removed than is actually necessary. Have the cushion plates in good order, and do not allow the leather to get cut or torn without immediately removing it. The web, as it leaves the detaching rollers, must be free from dirt, with the fibres thoroughly straightened and laid side by side. If it looks cloudy or nappy, the setting ought to be at once looked to. If it looks curly, instead of being straight and level, some of the detaching rollers are at fault, and require attention. A bad leather roller ought to be at once replaced with a new one, as, in carding, the lighter the combing the better the production. In drawing, the drafts should not be too great, nor the revolutions of the rollers too quick, as the sliver is apt to get "*ratched*." Where loose boss rollers are in use, let them be kept well oiled, and, above all, free from dirt. The stop motions at the back and front of the frame must be kept in good order, otherwise, singles and irregular yarns cannot be avoided. Have the flats or cleaners that cover the rollers cleaned as often as possible to prevent the flat waste from gathering and being carried through with the good material. The flutes of the rollers must be kept sharp, and the setting suited to the length of the cotton staple to be used—this is done by means of periodical scourings. The twist imparted to the sliver in slubbing, intermediate, roving, &c., should only be sufficient to admit of its winding off at the succeeding operation without breaking. Hard twist means, not only less production, but also, inferior drawing at the next operation. The winding on of the

rove on the rollers must be proportioned to the length delivered from the rollers. If the circumferential velocity of the bobbin, at any part of the process, exceeds that of the delivering rollers, then the rove is, of a necessity, "ratched," weakened, and made unlevel. With regard to the rollers and drawing process, the same remarks are applicable as those made above in connection with drawing and the drafts. The spinning mule should be well attended to if good yarn is to be obtained. The carriage should be well set and the points of the spindles must be at an equal distance from the bite of the roller along its entire length. Where this is not attended to, the yarn will be snarly. The "copping" is another point of the greatest importance. In the building of a cop, the bottom should neither be too short nor too long, and the body should be of an equal thickness throughout, with the "nose" well tapered. The building faller should be set a certain distance from the spindle rollers, which should be the same at any part of its length. The quadrant must be so regulated as to wind the yarn on at an equal tension throughout the inward traverse of the carriage. The check band should never be tight, except when the carriage just touches the stops, or the drag on the inward run of the carriage may be too great. As regards the rollers, what has been said about "slubbing" is applicable, only attention to the mule arrangements is much more a necessity. In a roller beam, where none of the rollers are weighted but the front row, care must be taken that their ends or points do not get stuffed with waste. In piecing the broken threads, bad and dirty joints are often made, which can easily be avoided on the part of the operative Slubby, soft, or dirty ends should be broken the moment they appear and, under no circumstances, allowed to run on the cop. In doffing a full set of cops, the fingers should be placed tightly against the spindle and the very bottom of the cop, and then raised up. In any other way, the bottom will be readily drawn out, and the cop spoiled. Let the drafts in the roller beam be as moderate as can be, and, where possible, especially in fine yarns, double roving should be used, as, thereby, greater uniformity and regularity in the yarn produced is assured.

The Mordanting of Wool.

(*To be concluded in our next issue*).

Continuing our remarks on the mordants most generally employed, let us commence with the oldest of them all—the alum mordant. In olden times, alum was used for mordanting wool, tanning hides, and impregnating wood, to render it incombustible, and it is highly probable that the old Egyptians used alum and other metallic salts for mordanting wool. Chemically considered, alum is a double combination of sulphate of alumina and sulphate of potash, and is readily obtained in large, well-formed crystals. Alum being used only for bright colours, it is indispensable that it should be free from iron, as, otherwise, a small quantity of the dark coloured iron lake of the corresponding dyestuff is formed, together with the pure aluminum lake. Traces of iron salts suffice, when dyeing with cochineal, alizarine, or madder, to make the bright red colour dull. For this reason, many dyers prefer the alum to the cheaper sulphate of alumina, because the former can, by re-crystallization, be obtained more readily free from iron. The sulphate of alumina occurs in commerce in amorphous lumps. Entirely pure sulphate of alumina is much cheaper than alum. From 1,000 parts of the former, 153 parts of alumina can be obtained, from 1,000 parts of alum, only 107. Seven parts of sulphate of alumina, therefore, replace 10 parts of alum. Under all circumstances, however, it is advisable to use alum and sulphate of alumina only when the guarantee is given that they are entirely free from iron. It is better still to thoroughly test them before using them as mordanting agents. The use of soft water being presupposed, wool is generally mordanted by boiling for 1½ or two hours with 6 to 10 per cent. of its weight of alum, and 4 to 5 per cent. tartar. For madder red, a very strong decoction, as much as 22 per cent. alum and 8 per cent. tartar, is required. As this mordant is a legacy of the past century, it may be assumed that it is the best for madder red, because even the most conservative dyer would prefer to use 6 kg. alum instead of 15 or 22 kg. if he were sure that he would obtain with it an equally fast colour. Despite many experiments, dyers have not yet succeeded in dyeing madder red with alizarine, as fast against fulling as with madder. It is not meant that a really useful method does not exist, but if it does, it is kept a secret. If a lot of wool for madder red, boiled for two hours with 20 per cent. alum, 8 per cent. tartar, and an addition of 5 per cent. fluid chloride of tin, is divided, and one-half dyed with madder and the other with alizarine, it will be found that the colour produced with the latter is always much livelier and handsomer. But it bleeds in fulling and changes in shade, while that of the madder, under similar conditions, is perfectly fast. It is a fact that, in Holland, madder is still dyed on wool, while in the dyeing of Turkey red on cotton and printing, it is completely crowded out of the field. The question to which of the constituents madder owes its fastness against the fulling liquor has not yet been solved. A number of analyses of dry, ground madder proved it to consist, besides 1½ per cent. of dyestuff, composed essentially of alizarine and purpurine, of starch flour, pectinic acid, resin, glucose, fatty substances, etc. The Badische Anilin und Soda Fabrik worked out a formula by which 10 per cent. alum, 3 per cent. tartar, 2 per cent. oxalic acid, and from one-half to 1 per cent. tin salt are used as a mordant. Dye with alizarine red, adding per 1 kg. [2lbs. 3¼ ozs.] of dyestuff: —200 grammes [7 1/10 ozs.] acetate of lime; 100 grammes castile soap; 50 grammes tannin. Fairly good colours may be obtained by this formula. They do not change their shade in fulling, although they tinge white wool somewhat. An alum bath is also used for cochineal in order to produce a crimson, also for the yellow vegetable dyestuffs, weld, fustic, flavine, &c. For bright yellow colours, tin salt is generally added to the mordant. Logwood is frequently dyed in a mixed alum and chrome copper decoction, when a lively medium blue is desired. A well-tested formula is:—Mordant, boiling for two hours with 14 or 15 per cent. alum, ¾ per cent. sulphate of copper, 1 per cent. chromate of potash, 3 per cent. tartar, and 1 per cent. sulphuric acid. For brightening, a little water blue (½ to 1 per cent.) is generally added to the mordanting bath. Dye in fresh bath with logwood. Immediately following the alum mordant, both in chronological order and general employment, are the tin mordants. According to tradition, their discovery by Drebbel, about 1600, was due to an accident. Beckmann reports that Drebbel used for the filling of thermometers an aqueous extract of cochineal, which accidentally contained a solution of tin in *aqua regia*, by which the cherry red colour was changed into a scarlet. Dyed swatches, which were found in an old sample book of the year 1779, showed that, during the last half of the past century, very handsome scarlet colours were dyed with cochineal and an addition of yellow vegetable dyestuffs. The dyer had very clearly described the various stages in the process and the agents used. A handsome scarlet on 18 lbs. of piece goods was produced as follows:—a few days before use, 2 lbs. nitric acid, about 6 lbs. fresh water, and ¾ lb. tin are placed in an earthen pot. The clear portion is then decanted in a glass. For bottoming, put 1 lb. fustic in a sack, and let it boil for about ½ hour in the kettle in which the scarlet is to be dyed. Take out the sack and pour into the kettle about ½ of the prepared nitric acid. Besides this, about 3 lbs. finely beaten tartar, ¼ lb. starch, previously stirred to paste in a basin, and, if desired, also, a little cochineal are added. 2 lbs. of prepared tartar are also taken. Enter and boil for 3 hours, pole out the goods, empty the kettle, fill it again, let the the water get warm, add the balance of the nitric acid, together with ¼ lb. starch, 1 lb. cochineal, 1 lb. tartar, crushed, and stirred together. The mixture is then permitted to get hot. Enter the goods and boil for ½ hour, or until the desired shade is obtained. If it is desired to keep the prepared nitric acid for a length of time, use ½ lb. sal ammoniac for each 2 lbs. nitric acid, when preparing the mixture. Some take weld, or young fustic, or turmeric, in place of the fustic, the latter being the best, although the dyer can see from the swatches what is necessary. The method of dyeing this colour to-day is essentially the same, the only exception being that the starch paste is omitted, and flavine is extensively used at present for imparting the yellow colour. As tin mordants are more or less used, saturated solutions of best quality tin in nitric acid, or in a mixture of nitric and hydrochloric acids, are preferable, on account of the greater certainty afforded to the dyer. Very satisfactory results are obtained from a decoction of 4 per cent. tin salt and 6 per cent. oxalic acid. A pure tin mordant is used only for cochineal. In England, where red is the colour of the uniform of the soldiers, and the dress of the sportsmen, cochineal scarlet is held in high esteem. It has previously been stated that the fulling operation strongly attacks all tin lakes, and, besides this, the spinning and fulling capacities of loose wool are largely deteriorated by tin salts. For this reason, red cloths are almost exclusively dyed in piece. Nor have experiments instituted in Germany for replacing the scarlet dyed facings of the military cloth with those dyed with ponceau or similar azo colours been more successful. The clear and transparent tone of the cochineal scarlets has never yet been successfully imitated. Next to them come those dyed with ponceau or orange, brightened with rhodamine. As already mentioned, tin mordants in combination with alum mordants are used in the dyeing of madder, alizarine, and yellow vegetable dyestuffs, if those dyed with alum alone are not sufficiently bright. The dyer must pay the very strictest attention, when using tin mordant, that it contains neither iron, lead, copper, nor any other metal. All the material, even the water, used in mordanting and dyeing must be absolutely free from iron. Only wooden vats can be used, and the steam coil must be of tin, free from lead. Tin kettles, with direct firing, are mostly used. Iron mordants composed of a double salt of sulphate of iron and sulphate of potash were apparently held in high esteem in former times. At present, sulphate of iron is almost exclusively used as an iron mordant on wool. Sulphate of iron is a protosulphate. In a clean condition, its pale bluish green crystals contain about 45 per cent. water. In moist air, it absorbs oxygen, and becomes coated with an insoluble film of yellowish brown basic sulphate of iron. When purchasing, large crystals are to be preferred, because they have less surface to be tacked, for which reason, sulphate of iron should be stored in a dry place and protected from the air. When heating wool in a diluted solution of sulphate of iron, this solution dissociates and precipitates insoluble basic sulphate of iron on the fibre. Unmixed iron mordant was, until recently, only recommended for nitrous dyestuffs, napthol green, and solid green, also for dioxine, a new dye of A. Leonhardt and Co. Its behaviour shows much similarity to the former. In most cases, iron is used together with chrome potash, sulphate of copper, or alum, because the pure iron lakes have frequently a fairly dull and empty look. Sulphate of iron is considerably used for saddening, when dyeing with dyewoods, and is added to the bath near the end of the dyeing operation. Its effect is to form dark-coloured iron lakes with a part of the dyestuff.

Shear Grinding.

In thus first grinding off the edge square, it is easily seen that we shall be more likely to get even work than if we relied entirely upon our eye-sight. In this way, we have a good square surface, and there is nothing at all to prevent our making good work. Continue grinding until the edge is reached, and then put back the ledger in its place. After securing the stay bolts, we endeavour to give the blade the correct pitch by means of the lower row of screws, commencing with the middle screw, then the two side screws, and, last of all, the quarter screws. Then, in order to set the blade up to the centre, we may resort to the following method, which is the second method mentioned before:—Take a try square and put the thick part in the box or journal of the revolver, keeping the thin part parallel with the centre mark, if there is any, if not, the boxes will have to be centred previously. Then take a small rule, with the edge perfectly straight, and put this straight side on the edge of the ledger blade, and move it out to the square, and, in this way, we shall soon see whether we are correct or not in our position. Both sides should be treated in the same manner, and brought up to the centre as nearlyas possible. Then re-place the revolver in its bearings, screw down its caps, and test, by seeing whether the blades will cut dry tissue paper. If at any point they do not happen to cut, tighten up just a trifle on the upper row of screws in the bed We are now ready to grind the revolver blades and the ledger blade together. All the grinding must be done with the revolver running in the opposite direction from what it does when cutting, and, on this account, it is called running back. At this juncture, we use flour of emery and oil, applied by means of a leather strap, made of old belting. Apply the emery and oil, being careful not to put it on too thick, moving the strap briskly to and fro, alternating the place of starting. The blades should now run at least an hour in the oil and emery to smooth and polish them up, and it will be found that, for this extra time spent at this stage, they will run longer and better. Remove the revolver after the grinding has been going on for a while, and ascertain whether there is a good, even, bevel on the back of the blades, and also see that the fine bevel on the face of the blade is not ground out. If all is right as it should be, re-place the revolver and proceed until finished. Then take the hone and rub the ledger blade carefully with that, either in the ordinary rolling motion or straight across from end to end, but be sure to keep the lower part of the hone about an inch from the lower part of the flat side of the blade. Then clean up, re-place the revolver, and fasten the caps thumb tight. Turn the revolver by hand out ways, and try with dry tissue paper if it will cut perfectly clean. After this, put on the swab and oil it carefully and well. Here, let us recommend to keep the swab well oiled. In fact, once for every piece is none too often. The point is to keep it evenly and thoroughly saturated, and, unless this is done, the blades will be in danger of heating, or else the cloth will be streaked. If the blades become hot, they inevitably expand and do bad work. If the oil is applied to the swab unevenly, then it is possible that the unevenness may become apparent on the cloth. Clean, white, lard oil, or neatsfoot oil, are either of them suitable for this purpose. Again, on the swab, there is often a danger that the flocks will gather and form a hard crust, through which it is almost impossible for the oil to have any action. This flock should not be allowed to accumulate, but should be thoroughly removed occasionally, as in this way only can we escape heating the blades, even when we naturally think there has been sufficient oil applied. As regards the cleaning of the flocks from between the blades of the revolver, we think it best not to do it except when the revolver is to be ground. The flocks between the blades seem to absorb the oil from the swab, and thus help to keep the blades from heating, while, at the same time, they can do no possible harm If the blades, now, become dull and refuse to cut well, insert a piece of cardboard to throw the revolver back from the ledger blade. Then run backwards and hone directly on the top, holding the hone parallel, and moving it regularly from end to end, being specially careful not to hone more in one place than in another. At the same time, emery and oil had better be used on the stone. Then, after the honing is done, re-set the blade, by means of the upper screws, until it cuts dry paper as above stated. In connection with having the revolver, one caution should be noted. After we have been grinding for a while, we shall find that the ends are sharper than the middle. This, it is plain to see, is quite natural, since the middle is always the dullest from having the most of the cutting to do. Now, a man who did not think might suppose that he ought to stop grinding at the ends, and work altogether at the middle. But, how foolish this would be is at once evident. Run the hone all the way from one end to the other, and, under no circumstances whatever, remain longer at the middle than at the ends, as the revolver would very soon get out of true by being hollow at the middle. After this is done, clean and replace the revolver in its proper position, and with care and frequent oiling, together with an occasional honing, the blades should keep sharp and do good work for three or four months, even on constant use and with bad stock. Let us urge again, before we close, as little tinkering and fussing at the shears as possible. Such work only leads to more trouble and worse and worse derangements all through the whole machine. Be very sure, first, just what is needed, and then proceed at once in the best way to remedy the defect, but do not try this and that experiment in the hope of hitting on something that may bring things to rights.—*Boston Journal of Commerce.*

Dyes and Colours.

DIAMINE BLACK.

Diamine black occupies an important position, not only as a direct black alone, but it is of service in connection with the older blacks. It possesses one great advantage, viz :—it dyes directly on cotton, without previous mordanting, in accordance with modern ideas. The cotton is boiled or worked in hot water, washed, and dyed in an alkaline or neutral bath. In my opinion, the simplest and cheapest is one made up with water containing ½ per cent. of sulphate of soda. Dyers are very familiar with this kind of bath. I prefer it to baths made up with common salt or alkalies, such as carbonate of potash and soda, soap, silicate of soda, borax, phosphate of soda, &c. However, for silk and cotton satins, it is convenient to work with a weak soap bath, on account of the silk. For 200 pounds of cotton use 500 gallons of water and 60 pounds of crystallized sulphate of soda. This bath can be made permanent, that is to say, water, sulphate of soda, and diamine black can be added to it as fast as the passage of the cotton exhausts it. The cotton should be worked at a boil for one hour, with occasional additions of colour to make the shade uniform. With amounts between 2 and 7 per cent., grayish blue to bluish violet black shades are obtained, together with intermediate bluish shades. Acids brighten and clear the shades sensibly, and give them a bluish cast. Shades so dyed resist a hard soaping, and are quite fast to fulling; they are fast to light. To complete these blacks, they can be covered with basic colours by passing them through a cold bath. The diamine black acts as a mordant for such colours as brilliant green, thioflavine, and safranine. In a soap bath, the cotton alone, in goods containing silk and cotton, is dyed, and the silk passes out white. By dyeing, a second time, in a bath which only dyes upon silk, effects in black and another colour can be obtained. Diamine black is discharged very well by zinc dust. By the addition of thioflavine to the discharge, as this colour is not affected by zinc dust, very pretty orange effects upon a black ground can be produced. Diamine black is now used to touch up aniline blacks, and render them ungreenable. While the aniline black tends to green in the air, under the influence of acids, diamine black tends to blue. These two effects neutralize, and the shade remains always the same. For mixed wool and cotton goods, it can be used with napthylamine black.

NAPTHYLAMINE BLACK.

This black dyes animal fibres a fast black. It may be used in neutral or acid baths, but a very acid bath is to be avoided. Like diamine black, it gives, according to the quantity used, shades from a violet gray to a dead black, by using from ½ to 4 per cent. of the weight of wool in colour, and to 7 per cent. for silk. The latter requires more colour than wool For loose wool in light shades, dye at a boil in water containing 1 per cent. of common salt, or 2 per cent. of sulphate of soda. The classic mordant for wool, tartar substitute, bisulphate of soda, is not fit for this work. It is too acid. For dark shades, it is necessary to use from 5 to 8 per cent. of the weight of the wool in acetic acid, and to dye at a boil all the time. These blacks upon wool can be shaded with napthol green, which dyes under the same conditions. The shades are fast to fulling. A black upon silk, which resists soaping strongly, can be obtained with 7 per cent. of napthylamine black, with the addition of acetic acid. Mixtures of silk and wool dye in boiling baths with the addition of 6 per cent. of the weight of the textile in acetic acid. By re-placing acetic acid by alum, fuller blacks are obtained, but they are more or less blue. Napthylamine black, like diamine black, gives shades which are fast to air, light, and fulling, and therefore to friction. Its great colouring power, together with its low price, assures it a great future. It works well with diamine black for silk and cotton goods, by the same method as that used for silk and wool goods. For cotton and wool goods, dye in a single bath with the addition of 1·5 per cent. of the weight of the water in crystallized sulphate of soda, after adding the necessary quantities of the two blacks, according to the weight of the two fibres. Napthylamine black, like diamine black, is discharged by zinc dust, and the same effects can be obtained with it in printing. Calcareous waters must not be used; it is easy to neutralize the lime in such waters, if the analysis is known. The colouring matter itself is alkaline, and, to dissolve it easily, it is necessary to add 1 per cent. of muriatic acid. Indian yellow and acid green are colours which can be used to shade napthylamine blacks on wool and silk, together with napthol green. This black gives, on silk treated with tannin and tin at a low price, a half-weighted fast black, which is cheaper than other similar blacks.—*Moyret.*

RHODAMINE.

A new colouring matter has just appeared in trade under the name of *rhodamine S.* Rhodamine S is designed particularly to replace carmine, and it gives very brilliant and beautiful shades of pink, faster to light than those yielded by carmine or phloxine. Rhodamine S dyes cotton, without a mordant, with the addition of acetic acid at a temperature of 85°—120° F. Dyed cold, the shade is not so full, but it is yellower. Upon cotton mordanted with tannin, shades are obtained which are

decidedly bluer and heavier, but less brilliant, although they are much faster to soap. By mixing auramine and rhodamine S, a series of shades can be obtained of yellow pinks, salmon, etc. For dyeing silk with cotton warp, sulphuric acid is more advantageous than acetic acid. Silk dyes in a neutral bath, giving a slightly bluish pink; in an acid bath or a soap bath, cut with acetic acid, more yellow shades are obtained. Upon cotton and wool mixed goods, with cotton warp, if acetic acid is used, very even shades, with a yellowish cast, are obtained, while, without acids, fuller and bluer shades are furnished. Jute dyes evenly in a neutral bath, taking a bluish shade of pink. The baths must not be thrown away, but must be kept and strengthened for use a second time. Rhodamine S can be used in cotton printing, either with acetate of alumina or tannin. The latter gives bluer shades, which are faster to soap. The new product has great colouring power and, from its method of application, should prove cheap. It is furnished in two grades, rhodamine S and rhodamine S extra.—*Moniteur de la Teinture.*

ESTIMATION OF INDIGO.

In *Romen's Journal*, there is published a process for the determination of indigo, which is simple enough to be done in a work's laboratory, and may yield good results. One gramme is taken, ground as finely as possible – dry, and then still further ground with water, until the utmost degree of division possible is attained, transferred to a flask marked in the neck at 250 cc., and 3 grammes zinc powder and 6 grammes caustic soda added. It is stirred up from time to time, and the reduction will be complete in an hour or two. By means of a pipette, 50 cc. of clear liquid is drawn off, placed in a shallow basin, and exposed to the air for 30 minutes, then an excess of hydrochloric acid is added, the precipitated indigo collected on a filter, washed, dried, and weighed.

DYEING SILK.

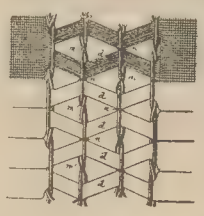
A new process for the dyeing of silk has been patented in France. It consists, chiefly, in the use of a "reduction bath," which appears to consist of a concentrated solution of magnesium chloride, containing chloride of tin. Any other saline body may be used, but the magnesium salt gives the best results. The saline body prevents the precipitation of the tin as oxychloride, which ordinarily happens when using tin crystals. After the silk has been passed in this bath, which contains 1 per cent. of chloride of tin, it is passed into a solution of catechu or other tannin products, whereby tannate of tin is deposited on the fibre, and the latter is weighed accordingly, and is also in a suitable condition for dyeing with the basic aniline colours. It is claimed that greater economy in the consumption of tin and catechu is effected by this process, also, that the silk is more easily washed, less soap is required, and the tenacity and elasticity of the silk is better preserved by the fixation of the tin in the cold. The patent, however, specifies the use of baths at a temperature of 70°C., which is far from being cold.

A Method of Soap Analysis.

The following method embodies a simplification of the usual process of soap analysis. It requires a separating funnel, such as is used by B. Röse, in his method for the estimation of the fat in milk. This is provided with a stopper and tap, holds about 230 cbc., and is graduated up to 200 in half cbc. Such a funnel is useful for many purposes, and should certainly be employed. The analysis is carried out by dissolving 2 grms. of soap in boiling alcohol free from acid, and if any matter is left undissolved, it should be filtered off and examined. A few drops of phenolphthaleïn solution are then added, and, if any red colouration is produced, the free alkali is determined by decinormal sulphuric acid. The neutralized liquid is diluted with water to about 80 cbc., and transferred to the separating funnel. As soon as the liquid has cooled to the temperature of the air, exactly 10 cbc. of normal sulphuric acid are added, and the funnel filled up to the 200 cbc. mark with a mixture of equal parts of ether and light petroleum. The moistened glass stopper is then inserted, fastened down with string, and the whole vigorously shaken until the fatty acids are completely dissolved. After allowing the funnel to stand for some time, the volumes of the aqueous solution and the ethereal solution are read off. To determine the fatty acids, 25 cbc. of the ethereal solution are removed by a pipette to a weighed basin, the liquid evaporated, and the residue dried and weighed. It can then be further examined, if required; *e.g.*, it may be dissolved in alcohol, and the saponification equivalent determined by titration. The alkali, combined with the fatty acids, is estimated by drawing off the acid aqueous solution by means of the tap, and determining the excess of sulphuric acid in 25 cbc. by titration with decinormal caustic soda. All the data are then obtained for the calculation of the alkali. The potassium and sodium may be separately determined by evaporating the neutral solution in which the alkali has been determined, heating to redness and weighing. As the sulphuric acid in the mixture is known, the potassium and sodium present can easily be calculated. The amount of soda added in titrating the excess of sulphuric acid, must, of course, be subtracted from that found, in order to give the quantity present in the soap. The advantages of this process are, mainly, that it avoids the wearisome washing and filtering of the fatty acids, that, at least, three determinations can be made of fatty acid and alkali in the same sample, and, that, if required, portions of the liquid may be submitted to further examination.—*Dr. Pinette.*

New Patented Fabrics.

An improved cloth, patented in the United States of America, consists of warp and weft threads, interwoven to form a fabric in which the warp threads are omitted at intervals, the warp chains interlocking with the weft threads along the edges of the spaces where the warp threads are omitted, and separating the weft threads into groups. Intermediate warp chains, also, interlock with the weft threads, and there are locking threads for the intermediate warp chains. Another fabric is also the subject of an American patent. It is made of cotton, and the face is more or less raised. The cloth is woven similarly to the annexed engraving, but, of course, the arrangement of the lines can be varied by having two or more longitudinal lines. These are crinkled somewhat, according to requirements and taste, and either one or both surfaces can be raised, which process heightens the effectiveness of the fabric.



A third example is of an improved method of making Wilton or Moquette carpets. It consists in, first, making a double pile fabric, composed of two sets of ground warps, a set of figuring pile warps, and weft threads, by interweaving the weft or threads with the ground warps, to form two ground or foundation fabrics, binding the pile warps ordinarily as warp into one of the ground or foundation fabrics, and for each transverse line of pile tufts to appear in the completed fabric, selecting certain shades of the pile warp yarns, and carrying them to the other foundation fabric, binding them therein by the weft, and immediately returning them to the first fabric, and binding them therein as warp until again required to appear in the pattern or figure. The double-pile fabric thus produced is separated by severing the connecting portions of the pile yarns. A fourth example is of an elastic woven fabric. It simply consists of a fabric which is provided at its edges with elastic warps, covered with braided fibrous threads. The annexed drawing will give an idea of the general arrangement of the elastic warps.

Commercial Failures.

According to *Kemp's Mercantile Gazette*, the number of failures in England and Wales gazetted during the five weeks ending Saturday, November 29th, was 404. The number in the corresponding five weeks of last year was 419, showing a decrease of 15, being a net decrease in 1890, to date, of 491. In addition to these gazetted failures, there were 299 Deeds of Arrangement filed at the Bills of Sale Office during the same five weeks. The number filed in the corresponding five weeks of last year was 315, showing a decrease of 16, being a net decrease in 1890, to date, of 226. The number of Bills of Sale published in England and Wales, for the five weeks ending Saturday, November 29th, was 887. The number in the corresponding five weeks of last year was 970, showing a decrease of 83, being a net decrease in 1890, to date, of 1058. The number published in Ireland for the same five weeks was 46. The number in the corresponding five weeks of last year was 37, showing an increase of 9, being a net decrease in 1890, to date, of 56.

Some months ago, we described at length a warp-weaver, invented and patented by Mr. A. Paget of Loughborough, and we also gave specimens of various goods made upon the machine. These included materials suitable for ladies' and gentlemen's vests, and similar articles for underwear; cloths in heavy, medium, and light weights, for ladies' jackets, and the same for coatings, trouserings, and vestings for gentlemen. We also gave a sample of cotton goods suitable for towelling and bath sheets. At the time these specimens were issued, we considered them a very great improvement on anything that had before been produced by knitting machinery, and thought there was very little room for amendment, but, on examining some new samples received a few days ago, we find that the patentee has succeeded in altering his machine for the better, and has produced cloths for ladies' jackets and gentlemen's coatings and trouserings which should be seen and examined by all who desire to produce these goods at a rapid and, therefore, cheap rate. We shall be glad to forward a sample to any manufacturer who is inclined to write to 10, Ann Place, Bradford.

Original Designs.

On our first plate is a design suitable for a Tapestry Table Cover, or for a Carpet of Brussels, Tapestry, or Scotch make, in any of which fabrics it would be effective.

* * * * *

On our second plate, we give a design for a Linen Table Cover, or Table Napkin. This has been designed by C. W. Sandiforth, 103, Racecommon Road, Barnsley, with whose designs our readers are familiar.

* * * * *

Our third plate contains figures suitable for either Mantle Cloths or Dress Goods of Tweed. Each figure is to be used as a separate design. Further reference to these will be found under the head of "Our Fashionable Designs."

Monthly Trade Reports.

WOOL.—The decline of prices and the rather easier demand at the London Wool Sales has had a slightly depressing effect upon the markets in the manufacturing districts, especially as prices were expected to come up to those of the close of last sales. Colonial and merino sorts seem to have been most affected. English wools have only been bought in small quantities, sellers, in most cases, having to take low rates in order to do business at all. This applies in an increased degree to the heavier classes of wools, such as Lincolns. In yarns, a very quiet feeling has pervaded the markets during the month, spinners generally being much in want of orders, which have been very difficult to secure, especially at such a rate as to leave a margin for profit Production has been considerably curtailed, and new business has been much below the average. Notwithstanding this, a rather cheerful view is taken of the situation, as, at present, stocks of both wool and yarn are low, and spinners are hopeful that, this being the case, they will be in a position to secure paying prices, should business take a turn for the better. The piece branches have, with the exception of heavy goods and worsted coatings, been fairly well employed. In connection with the latter, a large number of looms are only partially engaged, and the outlook at present is rather depressing. Prices for most classes of fabrics have been fairly maintained, and orders, though in small quantities, have come in moderately well.

COTTON.—The most influential circumstances affecting eth Manchester market for yarns and goods, during the past month, have been financial and monetary. Of the latter kind have been the continued unsettled condition in the Eastern and Argentine exchanges. But much more important than these, as influencing business here, is the extremely critical state of affairs in the banking and Stock Exchange departments in the City of London. The demand for goods and yarns during the past month, has, under the severe pressure of these depressing, influences, been reduced to very small dimensions. Many manufacturers and spinners still hold forward contracts sufficient to keep their machinery going for several weeks to come, and these contracts are undoubtedly the main strength of the market so far as prices are concerned. Still, the question has now to be considered how far producers should commit themselves to forward engagements at the low rates at present offered. As a rule, these are being refused where they are below the cost of production, and, although the current demand for all markets is, at the best, quite moderate, manufacturers and spinners do not show much inclination to force sales. On the contrary, there is a prevailing disposition to await the future course of events, and to anticipate rather a rise than a fall of prices. In the case of yarns, however, this expectation is seriously weakened by the fact that, whilst spinners have a profitable margin, manufacturers who have to buy yarns are rarely able to make both ends meet.

LACE.—A month ago, there seemed signs of an improved state of things in the lace trade, but these have almost disappeared, and a very quiet feeling is pervading the industry. Although production has been curtailed, stocks gradually accumulate. Some varieties of millinery goods have had a fair demand, but at rather low rates that are, on the whole, anything but satisfactory. Bobbin and mosquito nets have met a moderate inquiry, but other descriptions have been quiet. The demand for curtains, window blinds, and vitrage nets, keeps fairly good and at moderately paying rates. Efforts have recently been made to take full advantage of the fact that Her Majesty, the Queen, had ordered laces from Nottingham, and hopes are entertained that the leaders of fashion will follow the example, and make these trimmings more fashionable than they have been for some years past.

LINEN.—This department of industry has shewn signs of improvement, in fact, in some branches, a brisk business has been done, and many orders booked. This has been especially the case for domestic linens for the home trade—glass, towel, toilet, and such like fabrics, having met with much favour. In bed linens also, more animation has been apparent, and the same may be said of fine table and other damasks, whilst fine linen, plain and fancy drills, diapers, huckaback, and crash fabrics have also had a steady output, and the demand seems likely to increase. In floor and carpet coverings generally a rather quieter trade has been done, and the sales of drabbets and bluettes have also diminished. Prices have generally shown a higher tendency.

WOOLLEN.—We are now between the seasons, when not only are few buyers in attendance at the market, but when there are not many orders placed, so that it is but natural that there should be a scarcity of buyers as well as of orders. Merchants have been holding aloof because of a general expectancy that wools would go down at the sales in London, and very few winter repeats have been coming to hand of late. Manufacturers who have been getting their previous orders out of hand pretty well up to date are now finding great difficulty in keeping their mills running, there is, therefore, a great deal of short time, though it cannot be said to be universal, as some firms, more fortunate than the rest, are busy. Travellers are out with ranges of next winter's goods, and some very choice designs are being issued, of which lengths will first be made to order, and then submitted to merchants for confirmation or otherwise. In some cases, these goods are being made at very low figures, comparatively, and should command a good market. The retail demand is still principally for serges, worsteds in fancy makes, vicunas, together with a good proportion of tweeds, though it is by no means brisk for any of these classes just now, for the reason stated previously.

Our Fashionable Designs.

We give, on page 67, several specimens of the most fashionable cloths for ladies' and gentlemen's wear. We can safely say that, for a great number of years, the popular taste has not tended, in such a marked degree as at the present time, towards designs of pronounced pattern. Nothing seems to come amiss so long as there is plenty of effect, even though, at times, it may be very ugly. In worsted, woollen, silk, velvet, cotton, and every material intended for the use of ladies, design is the chief feature. Large checks, large ornamental figures and diaper effects are the rage, the two former being particularly noticeable in tweeds, etc. We give a design for a large check effect on a grayish-brown ground. This forms one of the best tweeds which can be found, as the check colours are not too prominent over the ground shade This, however, is a simple matter of colouring, and for those desiring bolder effects, other shades will readily suggest themselves for use in this pattern, The diagonal serge costume cloth can be made in any of the shades now so fashionble, one of the most effective being terra cotta. We give the pattern as a plain diagonal, but it should be made with figures, about four to six inches apart, such as large split balls, a circular scroll or spray of leaves, not less than from 1½ to 3 inches in diameter. On our third special plate, will be found some designs suitable for figures for a cloth of this description. They are also particularly useful for tweeds, and should be produced in good solid colours, on flaked, striped, diagonal, or check grounds. There is scarcely an end to their application. We now come to a fashionable check in cotton dress goods. At present, many enquiries are made by buyers for very large plain or twilled cotton checks, principally for the West Indian and other Colonial markets. This design is suitable for such purposes, and a range made from the pattern and colour combination given ought to command success, and, if care is taken in the selection of a bright, clear, and clean material for warp and weft, a really elegant style will be produced. We now come to a pattern for linen diagonal dress goods. This make of goods will be much in favour for the spring season of 1891. We give, also, some new and original designs for shirtings—particulars of which will be found with the designs. The patterns for gentlemen's cloths consist of a bold striped tweed trousering, which has also a check overlaying the stripe, and a striped worsted of a novel and original colouring.

Mr. G. H. Portal, Her Majesty's Charge d' Affaires at Cairo, states that the cotton crop in Egypt this year gives every sign of being a good one, owing chiefly to the improvement in the supply of water during the low Nile, but, as the principal merchants and dealers in cotton have not yet got rid of their last year's purchase, and as the fall in the price of cotton in Liverpool will prevent them from disposing of it at a paying price, they will not be willing to purchase the new crop. Another difficulty with which cultivators will have to contend this year is the rise in the freight demanded at present by the steamship companies for the conveyance of goods from Alexandria to Liverpool. There are not many ships visiting Egypt just now, consequently, they have it in their power to charge exorbitant prices for the carriage of Egyptian goods.

TABLE COVER.

LINEN TABLE COVER.

FIGURES FOR MANTLES OR DRESS GOODS.

Fashionable Designs.

* * * * * A Supplement, containing Woven Specimens of the Designs given on this page, is presented each month to those of our Subscribers who manufacture Cloth for Ladies' and Gentlemen's wear.

Ours was the first Journal in this country to give woven samples of various descriptions of fabrics regularly each month, and since we commenced this feature, some years ago, it has, to some extent, been adopted by others. In matters connected with every branch of designing, we stand ahead of all other Journals.

Large Check for Costumes.

No. 665.

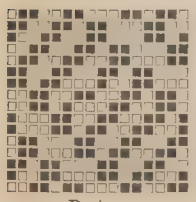
1,920 ends in warp; 30 ends per inch; 7½'s reed, 4 in a reed; 34 picks per inch; 64 inches wide in loom; 56 inches wide when finished. Weight, 11 ozs.

Design.

Warp :—		Weft :—	
40 ends	Brown, 24 skeins.	40 picks	Slate, 25 skeins.
2 ,,	Twist, 7's worsted.	2 ,,	Twist, 7's worsted.
24 ,,	Brown, 24 skeins.	25 ,,	Slate, 25 skeins.
2 ,,	Twist, 7's worsted.	2 ,,	Twist, 7's worsted.
14 ,,	Brown, 24 skeins.	15 ,,	Slate, 25 skeins.
2 ,,	Twist, 7's worsted.	2 ,,	Twist, 7's worsted.
84 ends in Pattern.		86 picks in Pattern.	

Woollen Trousering.

No. 666.



Design.

Warp :—

5 ends	Brown, 9 skeins.
4 ,,	Brown and White, 9 skeins.
2 ,,	Black and Orange, 9 ,,
4 ,,	Brown and White, 9 ,,
5 ,,	Brown, 9 skeins.
10 ,,	Black and Blue, 9 skeins.
30 ends in Pattern.	

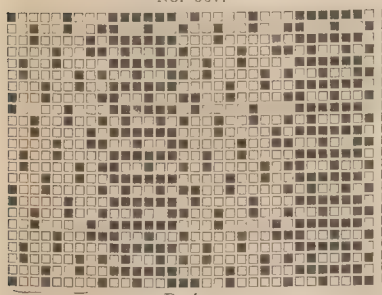
Weft :—

34 picks	Black, 10 skeins.
2 ,,	Black and Orange, 10 skeins.
36 picks in Pattern.	

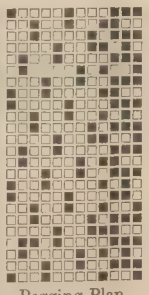
1,550 ends in warp; 24 ends per inch; 6's reed, 4 in a reed; 28 picks per inch; 64 inches wide in loom; 56 inches wide when finished. Weight 21 ozs.

Worsted Trousering.

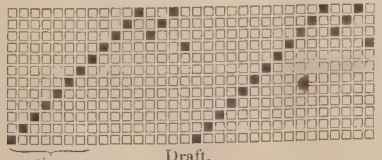
No. 667.



4 times. Design.



Pegging Plan.



4 times. Draft.

Warp :—

1 end	Silk, 40/2.
30 ends	Brown, 2/30's worsted.
1 end	Silk, 40/2.
8 ends	Slate, 2/30's Worsted.
8 ,,	Brown, ,,
8 ,,	Slate, ,,
56 ends in Pattern.	

5,120 ends in warp; 80 ends per inch; 20's reed; 8 ends in a dent; 80 picks per inch; 64 inches in reed; 56 inches wide when finished. 19½ oz cloth.

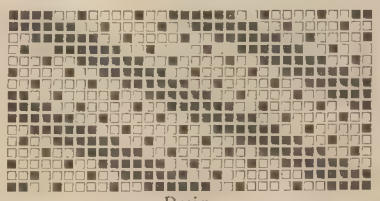
Weft, 2/30's worsted.

Diagonal Serge Costume Cloth.

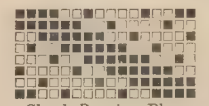
2,320 ends in warp; 36 ends per inch; 9's reed, 4 in a reed; 38 picks per inch; 64 inches wide in loom; 56 inches wide when finished; 10½ oz. warp; 2/24's worsted weft; 12's worsted.

A Large Cotton Check for Dress Goods.

No. 669.

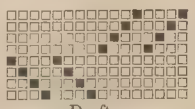


Design.



Check Pegging Plan.

Pegging Plan.



Draft.

4,224 ends in warp; 36's cotton twist, or two-fold 72's; weft, 36's single, very soft spun, unsized; 48's reed; 2 in a reed; 96 ends per inch, double width; 44 inches in loom; 96 picks per inch. Yellow lists. Half patterns of warp only at the edges.

This pattern may also be made plain, and with a Cassimere Twill in Worsted Materials.

Weft same as Warp. Blue to be all Dark Eau de Nile.

Warp :—

226 Blue.	8 White.	16 Black.
12 Mid Coral.	2 Black.	4 White.
226 Blue.	6 White.	16 Black.
18 White.	4 Black.	4 White.
2 Black.	4 White.	16 Black.
6 White	6 Black.	4 White.
4 Black.	2 White.	16 Black.
4 White.	10 Black.	24 White.
6 Black.	24 Blue.	18 Blue.
2 White.	6 Light Sky and Dk. Orange Twist.	12 Black.
12 Black.		2 White.
18 Blue.	24 Blue.	6 Black,
24 White.	10 Black.	4 White.
16 Black.	2 White.	4 Black.
4 White.	6 Black.	6 White.
16 Black.	4 White.	2 Black.
4 White.	4 Black.	18 White.
16 Black.	6 White.	946
4 White.	2 Black.	
16 Black.	8 White.	

Linen Diagonal Dress Goods.

No. 670.

32 to the round; 38's reed; 2 in a reed; 76 ends per inch; 76 picks per inch; 30 inches wide in the loom.

If any dark shade is used in warp, the weft must be a light shade, and *vice versa*.

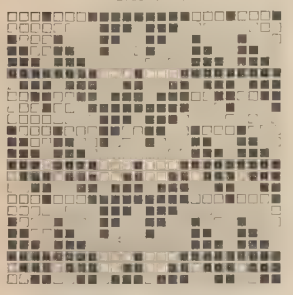
Draft, straight over.

Warp and Weft:—56's Brown or White Linen.

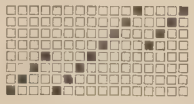
Design.

New Shirting Designs.

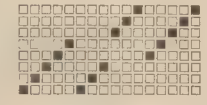
No. 671.



Draft for No. 671.



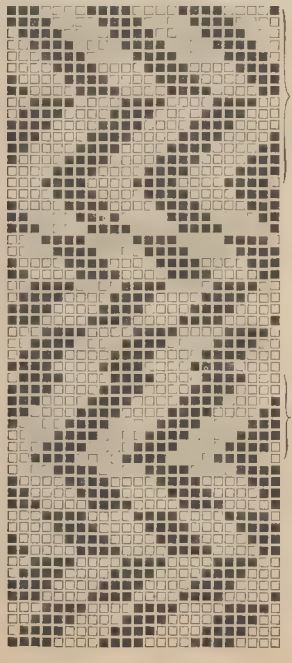
Draft for No. 672.



No. 671. Pegging Plan.

No. 672. Pegging Plan.

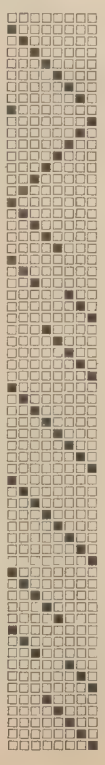
No. 672.



B.

A.

Full Draft of Number 2, including Stripes A and B.



A few variations in Drafts and Pegging Plans are given with No. 1 and 2 arrangements. An almost inexhaustible number of novel and interesting patterns can be developed from this design. No. 1 is an all over effect. No. 2 has stripes, A and B, which can be increased or diminished at will by the Draft—and any twill within the range of eight-shafts can be used with advantage. In point of economy, designs of this description ought to be very acceptable to manufacturers of this class of goods. No 1 pattern, warp 20's cotton twist, in a 24 reed, 8 in a split, 72 ends per inch, 30 inches wide in the loom, all self-colours, as dark blues, maroons, chocolates, and dark browns; weft—soft spun 20's cotton cop, 48 picks per inch. The same particulars for No. 2, in reed, counts, and picks; warp pattern, 32 sapphire blue, 20's cotton twist, 16 dark buff, 32 sapphire blue, 16 mid coral, total—96 ends in pattern; weft very light cream, in 20's unsized cotton.

MACHINERY, &c.

Wilson Bros'. Limited, Improved Bobbin for Dyeing.

An improved bobbin, which will meet a long felt want, is now being put before spinners, manufacturers, and dyers, of various descriptions of yarns. Its main object is to allow of yarn being steamed or dyed upon the bobbin. Numerous efforts have been made in the past to effect this object, the results, however, have not proved satisfactory, but the bobbin now being made by Messrs. Wilson Brothers, Limited, of Cornholme, Todmorden, will, we venture to assert, satisfy the requirements of those wishing to dye or steam their yarns in an effectual manner, and at less expense than by the processes generally in vogue. The illustration gives the main features of the improvement. The bobbin is fluted or, rather, has parallel grooves nearly its full length, whilst it has also grooves around it at certain distances, which, of course, cut through the parallel grooves, it is, also, perforated at intervals. But, perhaps, the leading feature consists in its being coated with an enamel, or water-proof and heat-proof material, both inside and out, which coating resists the action of steam

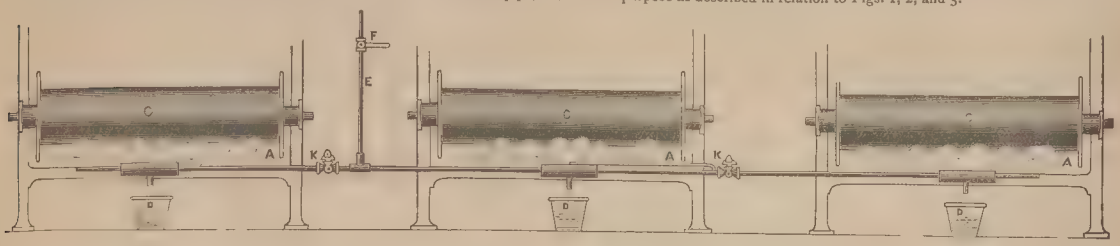
Wilson Bros'. Improved Bobbin for Dyeing.

and boiling liquor, which, therefore, have no appreciable effect upon the bobbin. This great advantage will eusure a considerable saving in the expenditure for the latter. The yarns to be dyed are wound upon the bobbins in the usual manner, they are then put into the steaming or dyeing process. The liquor, it will be readily seen, reaches the yarn nearest the surface of the bobbin by passing inside the tube, through the holes, then along the parallel grooves—thus thoroughly working its way through the under layers of the yarn, dyeing or steaming it equally well on its upper and under parts. Our readers will see the great advantages and saving effected by the use of this latest improved bobbin, and in order to give them a fair test, Messrs. Wilson Brothers, Limited, will be pleased to answer any inquiries that may be made. We may add that, in cases where it is not necessary to have bobbins with the parallel grooves and holes in them, they can be had of the ordinary pattern, coated with the heat and steam-proof enamel, or any bobbins now in use can be coated with the same preparation, at a small cost, on application to the above-named firm.

Apparatus for Steaming Warps during the Process of Weaving

Some two years ago, we gave a description of an apparatus to be applied to looms, for the purpose of steaming warps, which had been patented by Mr. J. White, Ellis Street, Burnley, since which time, some decided improvements have been made in its mechanism, &c. As we have stated many times before, there has been much agitation in the cotton manufacturing districts against the excessive use of steam in factories, where certain classes of cotton fabrics are being woven. The yarns for these fabrics are made in such a manner that manufacturers insist on the atmosphere of the factories being more or less moist in order to facilitate the weaving process. This fact has been the cause of much ill-feeling, as, undoubtedly, the great humidity has had a bad effect on the health of the weavers. As is generally known, steam has to be infused into the weaving rooms by means of jets from ordinary steam pipes, and, however objectionable the practice has hitherto been, manufacturers maintain that, until some other approved method ot damping the warps can be invented, it is totally impossible to produce certain descriptions of fabrics, unless the practice is continued. Mr. White's apparatus consists, essentially, in applying steam to each individual warp, in contradistinction to the usual method. He

arranges a perforated tube in juxtaposition with each separate warp beam. Steam is conveyed by suitable pipes to each tube from the main pipe in the shed. To prevent the application of steam to the warp while the loom is at rest, a stop tap is arranged, and can be connected to the set-on motion so that, immediately the loom is stopped, the tap is at once automatically closed to the entrance of steam. By this method, from 50 to 70 per cent. less steam is required than by the system now in use. All ventilators can be kept open in weaving sheds. The general arrangement of the pipes and mechanism can be seen from the illustration, which is a back view of three looms. C is the warp beam, A is the perforated pipe, from which the steam goes into a trough and then rises to the warp. The upper portion of the pipe,

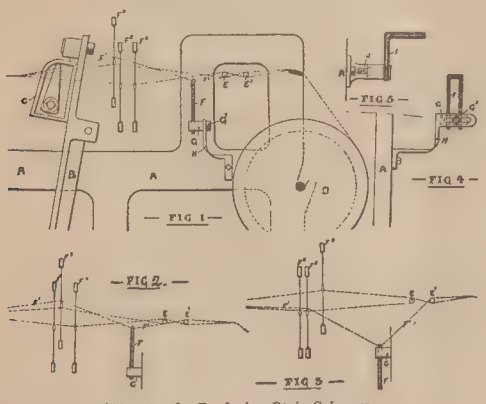


Apparatus for Steaming Warps during the Process of Weaving.

E, is connected with the main steam pipe at the top. K is a tap for turning on steam. Pipe A has a covering underneath to prevent the accumulation of fluff and dust, and also a trough to carry condensed steam into a bucket, D. The supply of steam can be regulated as required. Mr. White will give full particulars of the cost, &c., on application.

Improved Apparatus for Producing Plain Selvages in Twilled Fabrics.

This invention has been patented for the purpose of dispensing with the use of "boats" employed in weaving plain selvages in twilled fabrics. The "boat" is composed of a light swing frame, having two horizontal and parallel bars, one on each side. The selvage threads are threaded alternately under and over these bars, and through the healds just over the eyes. In passing to the "boat," the selvage threads do not pass through the lease rods, but are conveyed direct from the back rest to the "boat." The selvage threads passing over the eyes of the ascending healds actuate the boat, and cause the depression of those selvage threads bearing against the eyes of the descending healds. It relates more particularly to "three stave twills," and consists in the employment of a staple or lever, which, by gravity or by an elastic medium, maintains automatically a uniform tension on those selvage threads passing through the healds above the eyes. In the accompanying drawings, Fig. 1 represents an elevation, in section, of a power loom, with the improvements applied. A is the loom framing; B the sley-sword; C the box-end or sley, D the warp beam; E and E^1 the lease rods. In this view, the staple, F, is represented as having its prongs projecting through holes formed in the guide, G, secured to the bracket, H, by the bolt, G^1.

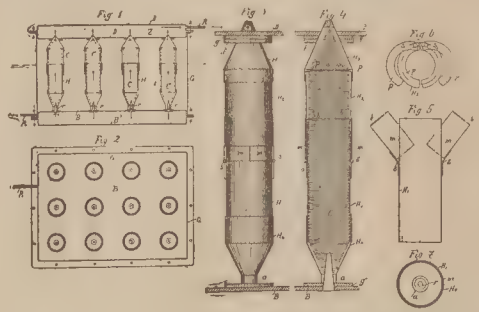


Apparatus for Producing Plain Selvages.

The staple, F, bears upon the selvage threads, F^1, passing through the loops of their respective healds, F^2 and F^3, immediately above the eyes, whilst the other portion of the selvage threads pass through the eyes of the heald, F^4. Two binder threads, at the extreme edge of the warp, are respectively passed through the eyes of the healds, F^2 and F^3. The disposition of the healds, in the first instance, is represented in Fig. 1, the heald, F^2, being raised, whilst the healds, F^3 and F^4, are lowered. The second move is represented in Fig. 2, the heald, F^3, being raised, whilst the healds, F^2 and F^4, are depressed. The third move of the twill is represented in Fig. 3, the two front healds, F^2 and F^3, are depressed, and the back heald, F^4, is raised. In the change of the healds, to the position shewn in Fig. 3, the slack of the threads, F^1, is taken up by the gravitating staple, F. Fig. 4 is a view transverse to Fig 1 of the staple. F, guide, G. and bracket, H. Fig. 5 represents a modification of the invention, wherein is mounted on a bracket, J, fixed to the loom side, A, a gravitating lever, I, the projecting or cranked arm of which bears upon the selvage threads passing above the eyes of the healds, F^2 and F^3, in a similar manner and for the same purpose as described in relation to Figs. 1, 2, and 3.

Improvements in Dyeing, Bleaching, or Washing, &c., Cops of Yarn, &c., and Apparatus.

This invention relates to a method of, and apparatus for, dyeing, bleaching, washing, or otherwise treating yarns in "cops," or in any of the similar forms, in which these yarns are fixed, in novel shaped sheaths or holders, and are brought in contact with the liquids or gasses necessary for treating them by means of any suitable suction or pressure apparatus. In the following description, the manner of dyeing is specially treated of, but the method remains the same, without any alteration in the apparatus, if, instead of a dye, a bleaching or washing liquid is intended to act on the yarns. In the accompanying drawing, Fig. 1 represents a sectional elevation of the apparatus, and Fig. 2 a sectional plan. The apparatus works in the following manner:—A vessel, G, of any suitable shape is provided with a double bottom, B, B^1, into which the dye liquor is introduced under pressure, or drawn in through the pipe, R. The inner bottom plate, B, is provided with a number of openings, in which are secured little conical tubes, *r*, *r*, *r*, reaching inwards, within the vessel, G, and holders, H, are put over these little tubes, in which holders, the cops, C, are placed to be dyed. The holders, H, end at the top in perforated cones, which traverse the lid, D, of the vessel, and over this lid an outer cover. D^1, is secured, so as to form a chamber, Z, from which an exit pipe, R^1, branches off. If a dye liquid be now forced under pressure through R or R^1 into the vessel, or be sucked through R or R^1 respectively, it penetrates the cops placed in the holders and dyes them. An arrow shows the course of the liquid but, of course, it could assume the opposite direction. Experience has, however, shown that, if the cops are simply placed in the holders, each wind of yarn is not dyed equally, there remains, especially in the middle and upper parts, weaker



Apparatus for Dyeing, Bleaching, or Washing Cops, &c.

dyed (fainter) portions, which can only result from the fact that the dye liquid has not had sufficient time to penetrate all the coils of the yarn in the tighter wound parts of the cops, and even, during its rapid passage through the holder, it does not reach certain coils at all. The object of this invention is to remove this drawback, that is, to compel the dye liquid to traverse all parts of the cops and thus to yield a uniform dyeing, and this result is obtained by means of peculiarly constructed holders, which place obstacles in the course of the liquid flowing through them, so that the liquid is forced to accumulate in various parts of the holder and make its way by travelling round the obstacles, whereby the liquid, through its longer detention at certain parts of the holder, finds time to reach and dye the whole body of the cops in all their coils. The new holder of this invention,

made of sheet metal and divided into several parts, is shown in Fig. 3, in elevation, and in Fig. 4, in section. Figs. 5, 6, and 7 are separate details of the same. The holder, corresponding to the shape of the cops, is cylindrical in its middle part, and runs into cones at each end. It is made in several parts, and provided in its middle and upper parts with obstacles for resisting the flow of the liquid throught it. These obstacles are small metal flanges, *b*, which project into the inside of the holder, and insert themselves between the coils of the cops. The cone, H^4, of the lower part, H^1, of the holder, ends in a small tube, *a*, which is placed over the little tube, *r*, bringing the dye. This part, H^1, of the holder is provided at the top with two plates, *m*, pivoted at *s*, which plates are bent up at right angles all round, so that the projecting flanges, *b*, project into the interior of the holder, or penetrate the coils of the cop, C. In Fig. 5, the small covering plates, *m*, are shown attached to the holder, H^1, by the hinge, S. The cop, C, is first placed in the holder. H^1, then the little plates, *m*, are pushed home, so that the flanges, *b*, penetrate into the coils of the yarn, as in Fig. 4. The middle part, H^2, of the holder is then put on the lower part. H^1. This middle part, H^2, of the holder is also supplied at its upper end with obstructions, namely, small metal plates, *p p*, which penetrate between the coils of the yarn, and can be turned outwards round the hinge, S^1, (see Fig. 6) which is a plan view of the part, H^2, of the holder, the small plates, *p*, being here shown separated and placed in proximity: in the latter case, they penetrate the yarn coils. Finally, the conical cover, H^3, is placed over H^2. This cover is provided with a small exit pipe, *o*, for the dye liquor Experience has shown that the cops are more unequally dyed at the places where the obstructions (insertion plates), *b* and *p*, are placed. By the insertion of these obstructions, the dye liquid has an obstructed passage through the holder. It accumulates at *b* and *p*, is compelled to force a passage for itself, in the direction of the arrow in Fig. 4, through the cops, penetrates them thoroughly, and thus dyes them uniformally in all parts. Small india rubber plates, *g*, are inserted between the sides, B and D, of the vessel for the purpose of making a tight joint, and, for the same purpose. the cap, H^3, has a flange, *f*, cast on, on which the washers are fitted. Fig. 7 of the drawings is a section of Fig. 4 on line *x x*.

A New Separable Spindle.

The spindle shown in the engraving is designed to obviate the necessity of using cop-bobbins, or quills, in spinning wool, and it is guaranteed to secure a better result in the quantity and quality of the work performed. It has been patented by Mr. George Bailey of Middleborough, Mass., U.S.A. The lower portion of this separable compound spindle has a cylindrical stub piece, on which is a whirl to receive a driving band, and on the upper end of the stub piece is mounted a coupling head, secured in position by a cross-key, or the stub piece may be screwed into the coupling head. The detachable part of the spindle, shown at the left in the illustration, is slightly tapering, and annularly grooved at intervals in its length, to prevent the yarn from slipping off until its removal is desired. Near the top surface of the coupling head is a transverse rectangular slot, and in alignment with this slot is vertically formed another slot of less width and length. The latter slot extends an equal distance on each side of the centre hole in the coupling head, and is adapted to permit diametrically opposite locking pins to enter into the wider slot below it, when, by a partial revolution, the detachable part of the spindle is locked fast to the coupling head. Just above the top end of the stub piece, a transverse slot extends through the coupling head, to permit the removal of dirt that might enter the socket hole, in which the detachable part of the spindle is seated. Cops or quills may be used with the spindle if desired, in the same manner as with other forms of spindles. When a spindle is filled, it can be removed bodily from the stub piece and coupling head by grasping the spun yarn and lifting the spindle, a slight revoluble movement releasing the interlocking connection of parts, and this spindle may be used in connection with many of the spinning machines now in use, without alteration of the same. Anyone acquainted with the manufacturing of hosiery and other yarns, where quantity is desirable, may readily observe that, with a very slight alteration in the knitting machine, these spindles may be extensively used, and any mill once equipped with them, will find a great saving in the expense of bobbins, etc. In using them with twisters, they are adapted to any size, and can be readily applied, as they are not any heavier than the ordinary spindle, and can be made suitable for the shuttle, as they take the place of the shuttle spindle, which is done away with.

The international parcel post system has been adopted by Greece. The postage is as follows:—For a parcel not exceeding 3 lbs., by Brindisi, Hamburg, or Marseilles—2s. 6d.; exceeding 3 lbs. but under 7 lbs.—3s. 0d. Under 3 lbs., by Cologne—2s. 10d., under 7 lbs. 3s. 3d. The delivery of such parcels, however, is limited to Aeghion (Vostiza,) Argostoli, Arta, Athens, Calamata, Chalcis (Negropont,) Corfu, Corinth, Lamia, Larissa, Missolonghi, Nauplia, Patras, Piræus, Pyrgos, Sparta, Syra, Trikala, Volo, and Zante.

The Purification of Waste Waters.

The annual report of an Austrian factory inspector contains the following:—The purification of the dye-house waste-waters is effected in a very thorough manner by a certain velvet factory in my district. The water, coloured with aniline and different vegetable dyestuffs, often looks like ink, and is cleansed by a system of cleaning basins. The three basins employed communicate with each other, so that the water flows easily from one to the other. The dirty water runs first into basin 1, in which it collects during the day, and remains there from 24 to 30 hours. The greater part of the impurities is deposited, and the upper layer of the water becomes more or less clear. The sluice gate is then opened and the partially cleansed liquid escapes into basin 2. During its flow, lime water is let in to precipitate the remaining impurities. The contents of basin 2 then remain standing for 30 hours, during which time the liquid, by reason of the lime water, becomes fairly clear. The connecting channel between basins 2 and 3 is then opened, and a mixture of sulphate of iron and sulphate of magnesia (bitter salt) is permitted to flow into the escaping water, which, after standing 30 hours, is then permitted to escape into the river or creek. Dye-houses which have a grass meadow near them can advantageously make use of the irrigating system. The grass acts as a filter, and retains all impurities, which conduce largely to the growth of vegetation.

Bradford Technical College.

The annual distribution of prizes, made by Mr. S. C. Lister to the successful students at the Bradford Technical College, took place on the 26th ultimo. Sir Henry Mitchell, President, occupied the chair. According to the report, the work of the year has been of a most satisfactory nature. For the fifth time, the school has obtained more scholarships, prizes, and certificates, than any other school of the kind in the kingdom. The number of prizes and certificates taken for science and art subjects is 1,307, against 1,224 in 1889, and one medal, and 355 advanced and honours certificates, against 301 of that year. The total value of scholarships gained by students this year is £864. During the last six years, 19 scholarships, of the collective value of £6,314, have been gained. The evening science classes have been fairly well attended, and classes for French, German, and Spanish have been held. In the art department, the number of students who have attended during the past session and the result of the work done in the classes have been satisfactory. The number of successes in the examinations exceeds that of 1889, which was the highest result obtained up to that year, although the number of students was somewhat less. Total successes, 1888-9, 262; 1889-90, 375. The work done in the textile department continues in a satisfactory state. Although there has been a falling off in the numbers, the attendance at the classes has been very good. The work in the cloth structure and analysis section has again been well maintained, many of the students attending four evenings per week. In the engineering department, the number of students in attendance during the session has been up to the average, though there is a slight reduction compared with the previous year. The work done has been of a highly satisfactory character, and the results obtained are considerably in advance of the previous year, in spite of reduced numbers. Since the opening of the College in 1883, over 90 day students have passed through the department.

German Commercial Travellers in Roumania.

A correspondent of the *Moniteur Officiel du Commerce*, writing from Kustendjé, gives one of the reasons why the German imports into Roumania have been constantly increasing for some years. He says the great facilities for payment accorded by German manufacturers to their foreign customers is one of the strongest reasons for their success. The necessity for giving long credits in that country would lead to the belief that profits cannot be very great. Such is by no means the case, and it may be said that this system considerably assists the German travellers, inasmuch as it differs from that followed by other commercial agents. A French traveller for a cloth house, for example, on going, for the first time, into a district, before soliciting orders, obtains information from the bankers as to the solvency of the drapers in the place, then he visits them and, in the event of his receiving any orders, the goods are sent separately to each consignee. The German traveller acts differently, at least at Kustendjé, and has recourse, for the information which he desires, to a commission house, which house informs merchants of good and established standing of the presence of the traveller, and brings the former into their own offices, where the commercial traveller submits his samples to them, and where all business is transacted. Then, as regards sending the goods, they are made up into only one single package, addressed to the commission agent, who remits them to the several purchasers. By these means, large savings are effected in expenses of transport, postage, and cartage, it is made impossible for the customer to take advantage of imaginary delays, and it also prevents the disputes often raised by the consignee with a view to obtaining a rebate. As regards payment of the accounts, this is effected through the agent, whose charges vary between two and four per cent. of the amount recoverable. In a word, German manufacturers, by having recourse to commission houses, establish secure relations in that country, where these intermediaries take the place of special agents charged with the protection of their interests.

Personal and Trade Notes.

The Hall Street Mills Co., Limited, has been formed to take over as a going concern the premises of Messrs. Henry Whitaker and Sons, Royton, known as the Hall Street Mills. The capital is £30,000 in £10 shares.

The Victoria Mill Co., Limited, Earby, Skipton, has been registered to acquire the Victoria cotton spinning mill and weaving shed. Capital £10,000, in £10 shares.

The Ellenroad Spinning Company has been registered as a limited company, with a capital of £90,000, in £5 shares, to carry on business as cotton spinners and manufacturers.

The Hazel Mill Company, Limited, Haslingden, has been registered, with a capital of £40 000, in £5 shares, to acquire the Acre Mill, Haslingden, and to carry on the business of cotton spinners and manufacturers.

Messrs. Coats of Paisley have announced their intention to give a few acres of land as a site for a Technical College for that town, as well as a sum of £3,000 towards the cost of the building.

The firm of Eastwood Bros. has been registered as a limited company, to acquire the business of woollen and worsted cloth manufacturing, carried on at Thirstin Mill, Honley, near Huddersfield. The capital is £25,000, in £10 shares.

It has been resolved to erect a Technical School at Batley to cost about £7,000. Mr. James Stubley has made an offer of £1.000 towards it on behalf of the firm of G. and J. Stubley, of Batley, woollen and worsted manufacturers, on condition that a sum of £6,000 could be raised.

The business of manufacturers of yarns and textile fabrics, carried on in Manchester by Paul Schulze under the title of F. H Colligs and Co., has been registered, with a capital of £9,000, in £6 shares, under the style of Paul Schulze and Co., Limited.

The celebration of the marriage of Mr. Thomas Kemp of Glasgow, the well-known and highly esteemed London representative of Messrs. Rutherford and Fleming, linen manufacturers, Glasgow, to Miss Fanny C. Taylor, took place on the 22nd ultimo.

Mr. Edward Crossley, of the firm of John Crossley and Sons, Limited, Halifax, has decided to retire from Parliament on account of delicate health, and Mr. James Booth, manufacturer, and late Mayor of the town, has been invited to contest the seat in the Liberal interest, but has declined.

A company, under the title of the Plodder Lane Mill Co., is being floated at Bolton, with a capital of £100.000, in £10 shares, to purchase a plot of land at New Bury, the site of two cotton mills formerly owned by Messrs. Joseph Whittam and Sons, and to build a first-class modern cotton mill, and fill it with new machinery.

The Head Master of King's College School suggests that employés who wish to engage clerks should apply to the principals of middle-class schools to have their wants supplied. This system, it appears, has been in practise on the Continent for some time, and, there is no doubt that, if it were adopted in England, the fact that a schoolmaster had it in his power to procure good mercantile appointments for his pupils would have a beneficial influence on master and pupil alike.

Stourport and neighbourhood have sustained a great loss in the death of Mr. T. B. Worth, eldest son of Mr. T. B. Worth, principal of the Severn Valley Carpet Works of that town. Although he was only 25 years of age, owing to the long continued indisposition of his father, he undertook the almost entire management of the concern, and thus came into close contact with the workpeople and with business men generally, by all of whom he was held in the greatest esteem.

The firm of Stewart, Moir and Muir has been registered, with a capital of £60.000, divided into 2,000 preference and 4,000 ordinary shares of £10 each. The object of the company is to take over the business now carried on by Stewart, Moir and Muir, in Glasgow and London, under that title, and at Newmilns, under the name of Wm. Moir and Sons. They intend to carry on the business of manufacturers of lace and muslin, as well as that of bleachers, dyers, and finishers of the same and similar substances, and that of importers and dealers in all kinds of goods, &c.. &c.

According to the *Bombay Gazette*, the laying of the "Corner Stone" of the Swadeshi Spinning and Manufacturing Company's Mills, Bombay, recently took place in the presence of a large number of shareholders, directors, and citizens. The ceremony was performed by the Chairman. The company was floated some time ago, with a complete plant of preparing and spinning machinery, which included about 20.000 ring spindles by the well-known maker, Mr. Samuel Brooks of West Gorton. Manchester, and to whom a further large order has been given through their agent, including amongst many other machines, 3 large size double openers, 3 porcupine feed tables, 9 single beater and scutcher lap machines, 46 single iron revolving flat carding engines on their new system, six drawing, six slubbing, nine intermediate, 21 roving, and 53 ring spinning frames, all containing their most recent improvements; 92 single reels, and many other machines, which the space at our command does not permit us to mention. We hear also that this firm continues exceedingly busy in their speciality—ring frames, and they have, too, recently received large orders for carding engines and preparation machinery, in addition to the one above named. Messrs. W. Calvert and Son, Walton-le-Dale, Preston, have, after keen competition, placed with them an order for 11 intermediate and 11 roving frames. Complete new patterns have been made by Mr. Brooks. and the frames made from these are giving every satisfaction. Amongst others who have lately placed orders for preparation machinery with this firm, we may mention Messrs. S. and E. Leese, Messrs. J and J. Haslam, Messrs. Hincksman, and Messrs. Wm. Bashall and Co., all of the Preston district, and Mr. John Smedley of Lea Mills, near Derby.

Odds and Ends.

The British acting consul at Chinkiang, China, says that one of the points that weighs against flannels is the shrinkage after washing. He is assured that the sale of flannel would certainly increase, if the shrinking could be prevented, or much reduced.

The bill for the amendment of the Factory Acts which the Government intended to bring in will, it is understood, raise the limit of age at which children may be employed in factories to 12, and the age up to which they may be employed in underground mines to 14.

The journal of the Chamber of Commerce of Constantinople states that the Ottoman Empire has concluded a commercial treaty with Germany to take the place of the one which came into force in 1862. The new treaty will give many advantages to the latter country. It comes into force in March, 1891.

An interesting experiment is about to be tried in St. Petersburg, in the founding of a factory for the weaving of silk. In the Caucasus. and more particularly in Central Asia, the keeping of silkworms is becoming more and more an industry of the people, and it is proposed to manufacture the raw material so obtained.

According to recent decisions of the Swiss Custom Authorities, ramie yarn pays duty on the basis of the English numeration of the yarns—Category 294, Duty, 60 cents per quintal. Category 295, 4 francs per quintal; whilst jacquard machines imported to Italy pay 11 lire (lire 9.$\frac{5}{16}$d.) per quintal. (220·4 lbs).

The seizure of 160 bales of wool has been made in New York, for fraudulent undervaluation. They were imported some months ago as cattle hair, and a thin layer of the invoiced grade was placed on the outside of the bales. Severe penalties are provided by the new M'Kinley Act for such offences. The value of the goods is put at 10,000 dollars.

Her Majesty's Minister at Belgrade advises British manufacturers, who desire to trade with Servia, not to send catalogues to the country, as the English language is not generally understood there, but to avail themselves, rather, of the services of some well-established agency in Servia, or to employ commercial travellers who understand the language spoken.

As there was some ambiguity about the provisions of the M'Kinley Tariff Act in regard to the raised duty on one or two descriptions of cloth goods, a test case, of interest to the North and West of England manufacturers, has just been decided by the Supreme Court. Imports of cloth, popularly known as diagonals, are liable to a duty of 24c. per lb. and 35c. *ad valorem*.

Among the new embroideries which are being prepared for the next spring season are embroidered leaves with veins of steel, gold, or silver. Between silk stitch embroideries are placed coloured and black cut pearl-stones, which have a very pretty effect. Embroideries in silk stitch, with beads put between, worked on fine tulle, are novelties. They are to be used for silk mantelets.

Mr. Elijah Helm, a gentleman well-known on 'Change and in Manchester warehouses as a cloth merchant, delivered the first of a short series of lectures on political economy that is to be given in connection with the Commercial Evening Schools, promoted by the Manchester School Board. Mr. Helm has long been known as an enthusiast on this and kindred subjects, and is quite able to give a masterly lecture.

The French Consultative Consular Committee, which recently met at the office of the Ministry of Foreign Affairs, considered the development of commercial museums, and decided in favour of the creation of new museums. At present, there are twenty-one such in existence in the country. The Minister of Commerce assists them by sending samples, books, &c., but only a very small sum of money is allowed in the budget for the help of these establishments. In 1889, £300 was divided amongst eight museums.

It is proposed to hold an International, Industrial, Commercial, Agricultural, and Fine Arts Exhibition in Bordeaux in the coming year. The Directors require active agents in the principal towns of France and her possessions, in Austria, Belgium, Bulgaria, Spain, Italy, Greece, Denmark, Holland, Russia, Portugal, Roumania, Sweden, Servia, Turkey, Egypt, China, Japan, North and South America, &c., &c. It has also been decided to hold a National and Colonial Exhibition in Lyons, from May 1st, to October 31st, 1892. The exhibition will include works of art, as well as products of industry and agriculture, from foreign countries.—No articles will be received after April 1st of that year.

With reference to the M'Kinley Tariff, Messrs J. Pollitt and Co., of Manchester, have sent to the *Manchester Guardian* the following copy of a letter received from one of their clients in Boston, dated November 6th:—"Well, what do you think of Americans now? You will have to admit that they are not all fools or gone mad. You will allow that we have summarily put our heel of disapprobation on this tariff monstrosity, and will proceed so soon as possible, as I told you we would, to smash the thing to pieces. Old Massachusetts did her duty in great shape. After all, this tariff business, I fancy, will prove a blessing in disguise, for it emphasises the issue and brings matters to proper shape all the sooner. The people have spoken emphatically with no uncertain sound, and their will must be obeyed. We hope we shall soon be be able to look Englishmen in the face with this foolish affair well off our statute books."

PATENTS.

Applications for Letters Patent.

Adjusting position of revolving flats. J. Higginson, Birmingham. 3rd Nov. 17,578
Breaking, scutching, hackling flax, &c. J. C. Mewburn, London. 5th Nov. 17,803
Brake apparatus for spindles of doubling machines. T. Coulthard, London. 13th Nov. 18,287
Beaters used in opening and cleaning cotton, &c. W. E. Heys, Manchester. 17th Nov. 18,498
Bobbins or spools. F. Fowkes, Manchester. 18th Nov. 18,578
Composition for fixing or mordanting colours. G. P. Gardner, Glasgow. 4th Nov. 17,642
Clearing and gassing yarns or threads. J. Kirkham, Manchester. 4th Nov. 17,653
Colouring matters. B. Willcox, London. 4th Nov. 17,712
Cloth cropping or clipping. W. Lee and G. Croll, Dundee. 7th Nov. 17,909
Card-setting. W. H. Kellett, Huddersfield. 8th Nov. 17,968
Combing machine stop-motion. T. Thornton, Keighley. 8th Nov. 17,972
Colour rubbing machine. J. Hitchen, Birmingham. 11th Nov. 18,124
Carding engines. J. A. Holdsworth and C. H. Woods, London. 11th Nov. 18,127
Combing wool, &c. A. Staples and J. L. Kitson, Leicester. 14th Nov. 18,347
Cotton cords. A. Clegg, Bury. 14th Nov. 18,352
Cutting chenille fur. J. J. Hughes, London. 14th Nov. 18,362
Colouring matters. John Imray, London. 17th Nov. 18,526
Colour (ultramarine process and apparatus). O. Imray, London. 17th Nov. 18,527
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Carding engines. J. Dawson, Bradford. 21st Nov. 18,863
Cop and pirn shuttles. J. Ireland, Dundee. 24th Nov. 19,023
Colouring matters. J. Y. Johnson, London. 25th Nov. 19,167
Doubling, &c., machines. W. J. Lyon and M. Fearn, Manchester. 3rd Nov. 17,585
Dye vats. T. F. and A. Naylor, Kidderminster. 5th Nov. 17,769
Dyed cotton yarns or threads. T. Salzmann, London. 6th Nov. 17,872
Doubling and twisting. G. H. Holden and J. Ashworth, Manchester. 7th Nov. 17,949
Dye-stuff (anthraquinone). B. Willcox, London. 18th Nov. 18,637
Dyeing fibres and tops and slivers of fibres. J. B. Whiteley, E. Whiteley, A. Armitage and W. Cleland, Halifax. 19th Nov. 18,700
Dye stuffs. S. Pitt, London. 24th Nov. 19,065
Decorticating ramie, &c. G. E. N. I. E. Subra, London. 25th Nov. 19,100
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Drying wool, &c. W. Tattersall, Bradford. 27th Nov. 19,360 and 19,362
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Embossing machines. G. Valiant and C. Daniell, London. 25th Nov. 19,188
Exhaust opening machines for cleaning cotton, &c. R. Taylor, Manchester. 26th Nov. 19,222
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Hydro-extractors, &c. T. Bradford, Manchester. 4th Nov. 17,654
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Knitting machines (circular). W. I. James, Stafford. 22nd Nov. 18,946
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Looms. H. Rawson, London. 7th Nov. 17,906
Looms (crank-shaft and tappet-rest motion). E. Horsfield, Blackburn. 8th Nov. 17,965
Looms. J. Stuttard, J. Hartley and J. Whiteoak, London. 13th Nov. 18,267
Lace fabrics (ornamental). J. Steiger-Mayer, London. 14th Nov. 18,378
Lace (twist). A. C. Travell, London. 14th Nov. 18,380
Looms for weaving sinuous lines into cloth, with yarn or thread supplied independently of warp and weft. J. W. Cheney and F. A. Bowen, London. 18th Nov. 18,626
Looms (needle-shuttle). W. E. Heys, Manchester. 19th Nov. 18,676
Lags for weaving. A. A. Wade and G. H. Taylor, Leeds. 29th Nov. 19,450
Mules for spinning. T. Pilkington and P. Boardman, London. 28th Nov. 19,374
Nap-raising machinery. E Coldwell, Huddersfield. 27th Nov. 19,307
Ornamentation and protection of selvages of pile, &c., fabrics R. Williams, Manchester. 27th Nov. 19,303
Pickers (loom). J. C. Mewburn, London. 13th Nov. 18,293
Preparing and spinning fibrous materials. W. Tatham, London. 14th Nov. 18,381
Preparing wool, &c. J. B. Sharp and S. Metcalfe, Bradford. 21st Nov. 18,551
Pulleys, &c. A. Dopp, London. 25th Nov. 19,195
Quilts, &c. J. S. Kerr, Glasgow. 26th Nov. 19,233
Raising textile fabrics. F. P. and H. Lees, Manchester. 8th Nov. 17,982
Ring spinning in cotton mills (improvement in) by "Expansion spring coil traveller." E. Harton, Bolton. 14th Nov. 18,328
Removing burrs, &c., from wool. W. E. Hays, Manchester. 18th Nov. 18,572
Roving and slubbing, &c., frames. W. Tatham, London. 18th Nov. 18,738
Reels for reeling cotton, &c. T. Sutcliffe, Bradford. 28th Nov. 19,391
Stokers (mechanical). W. Fraser, Birmingham. 6th Nov. 17,838
Shuttles. H. Cruse, Manchester. 8th Nov. 17,995
Silkyfying tissue threads, &c. C. Brodbeck, London. 11th Nov. 18,119
Spindles (ring and cap frame). C. N. Pickworth, Manchester. 13th Nov. 18,257
Scouring or treating wool, &c., and apparatus. C. Campbell and H. D. Shaw, London. 14th Nov. 18,375
Stockings, socks, &c. E. H. and C. H. and E. W. Wynne, London. 15th Nov. 18,411
Shuttle guards. W. H. Gartside and W. E. Harrop, Oldham. 17th Nov. 18,503
Steam engines and centrifugal governors therefor. T. and W. H. Smith and T. Eastwood, Halifax. 19th Nov. 18,701
Sectional-warps (produc ng). B. Cohnen, Manchester. 21st Nov. 18,849
Slubbing and roving frames (improvements in). W. Tatham, Rochdale. 21st Nov. 18,859
Shuttle springs. A. Robache, London. 22nd Nov. 18,938
Shuttles. J. and J. Ingham, Bradford. 24th Nov. 19,019
Scouring machines. P. A. Newton, London. 25th Nov. 19,175
Spindles and bobbins for ring and traveller spinning and doubling frames. T. Wrigley, Manchester. 25th Nov. 19,206
Spinning frames (ring). J. O. O'Brien, Manchester. 29th Nov. 19,460
Treatment of vegetable fibrous materials. P. W. Nicolle and J. Smith, London. 13th Nov. 18,284
Tapestry, carpets, rugs, &c. E. Smith, London. 17th Nov. 18,511
Treating resinous or gummy fibres. J. Palmer, London. 22nd Nov. 18,955
Transmitting motion from one spindle to another at varying angles. J. W. Newall, London. 25th Nov. 19,101
Trimming or finishing knitted or woven articles. J. L. Berridge and G. Blunt, London. 26th Nov. 19,283
Warp machines. R. Thornton, Nottingham. 3rd Nov. 17,571
Winding yarn, thread, &c., on to bobbins, spools, &c. J. W. Shepherd, W. Ayrton and R. Clegg, Manchester. 8th Nov. 17,981
Winding thread on disc holders. J. Keats, London. 18th Nov. 18,662
Waterproofing fibrous material. H. B. Kenyon, London. 21st Nov. 18,907
Warp-dressing frames. J. Pickstone and H. Mann, Radcliffe. 26th Nov. 19,225
Washing wool, &c. W. Tattersall, Bradford. 28th Nov. 19,359
Washing or cleansing textiles. J. Haworth, Church. 28th Nov. 19,367

Patents Sealed.

15,439	18,957	3,928	8,177	11,873	14,070	14,184	14,364
14,544	14,810	15,206	16,638	17,172	17,325	17,736	18,240
7,051	8,297	14,699	16,071	17,104	17,149	17,845	17,874
17,901	18,221	18,310	19,337	11,400	11,498	12,689	16,873
17,620	17,818	18,115	18,239	18,394	18,517	19,057	19,195
6,692	9,592	12,776	12,950				

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